NSE Institute

FortiClient Study Guide

for FortiClient 6.0

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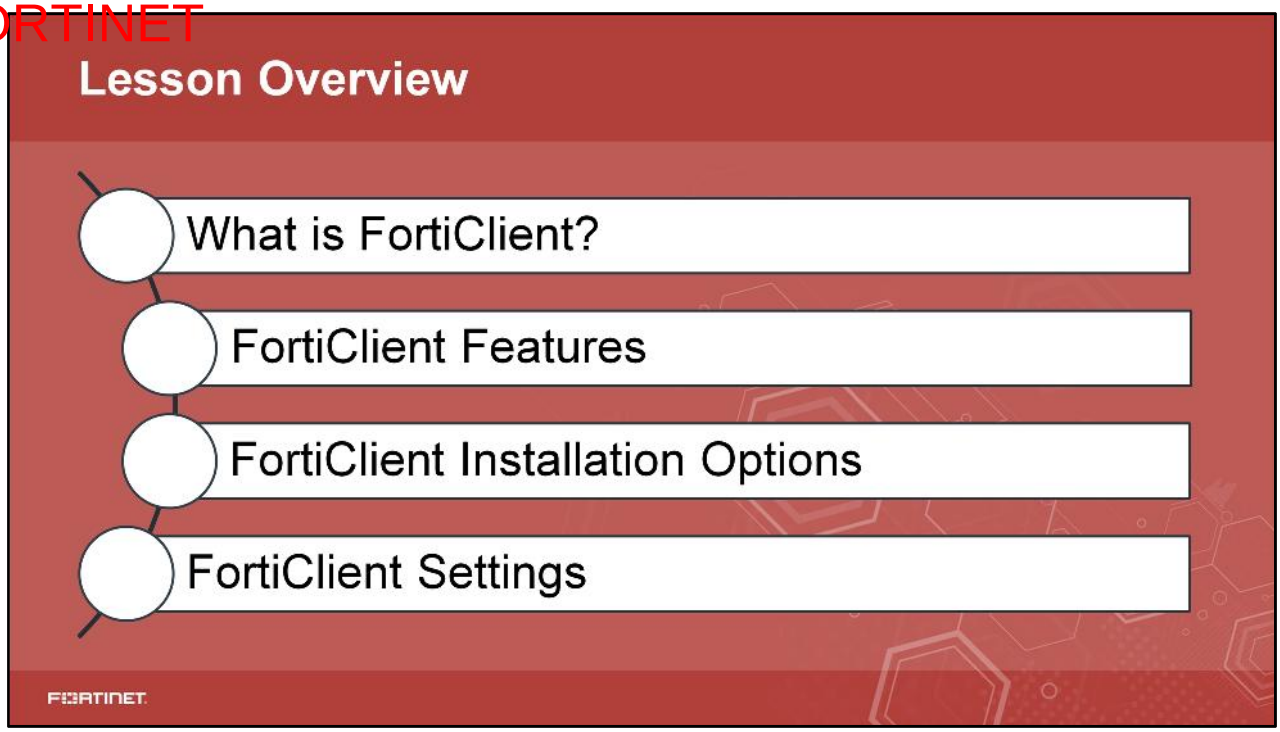
Feedback

Email: courseware@fortinet.com

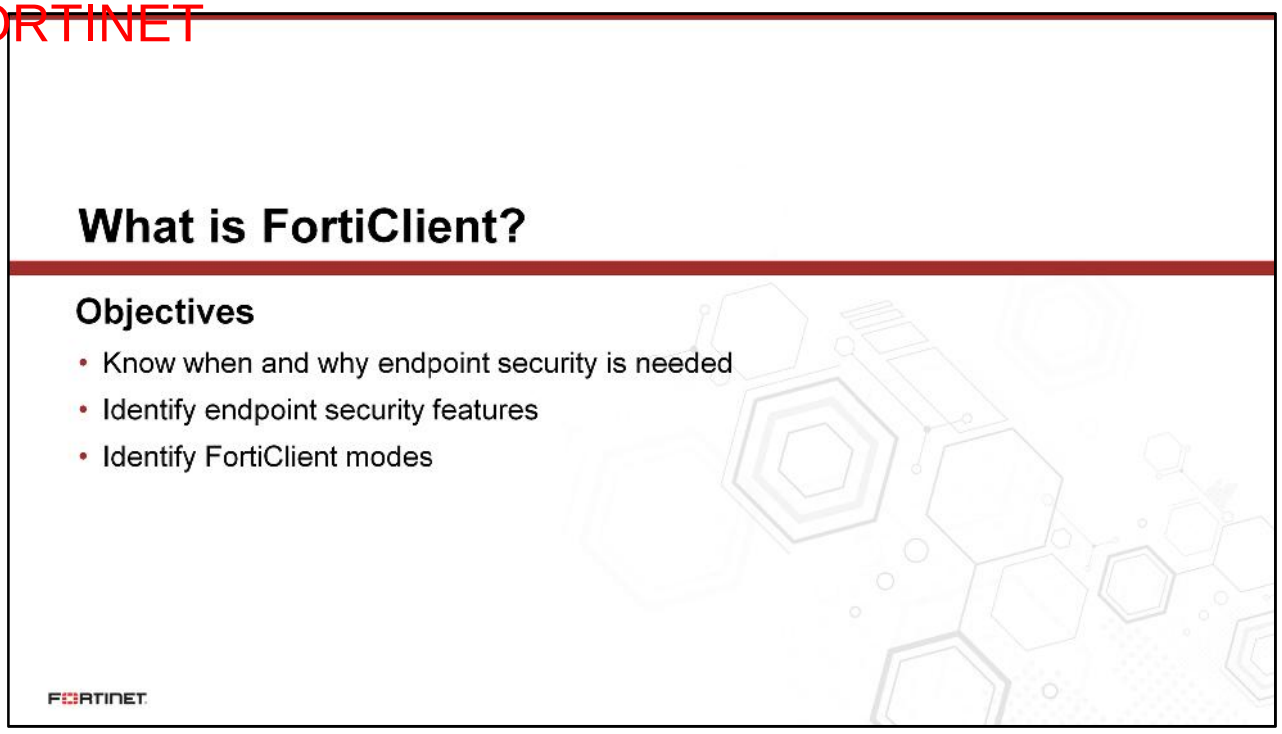
4/8/2019

TABLE OF CONTENTS

After completing this lesson, you should have skills that you need to integrate FortiClient into your existing network and manage the security of multiple endpoint devices from a single management console, such as FortiClient Enterprise Management Server (EMS).

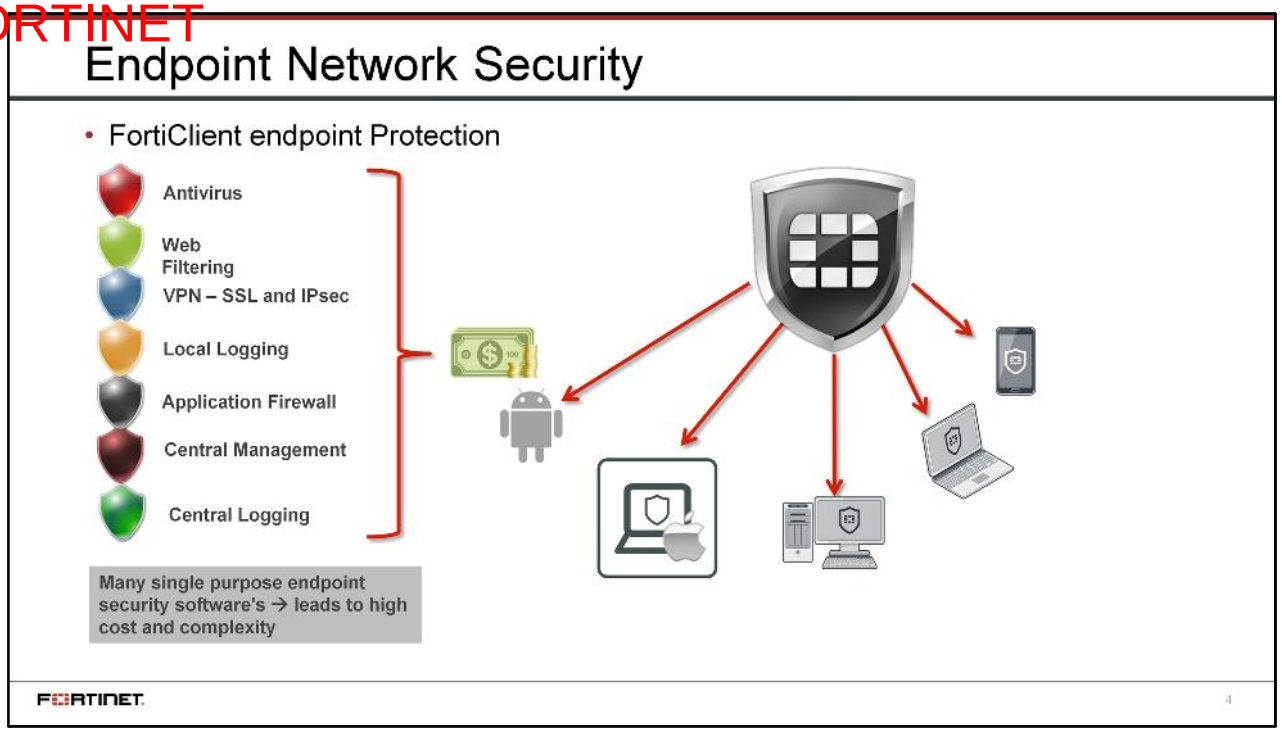


In this lesson, you will learn about the topics shown on this slide.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating an understanding of what FortiClient is and what it does, you will be able to understand how FortiClient fits in to your network.



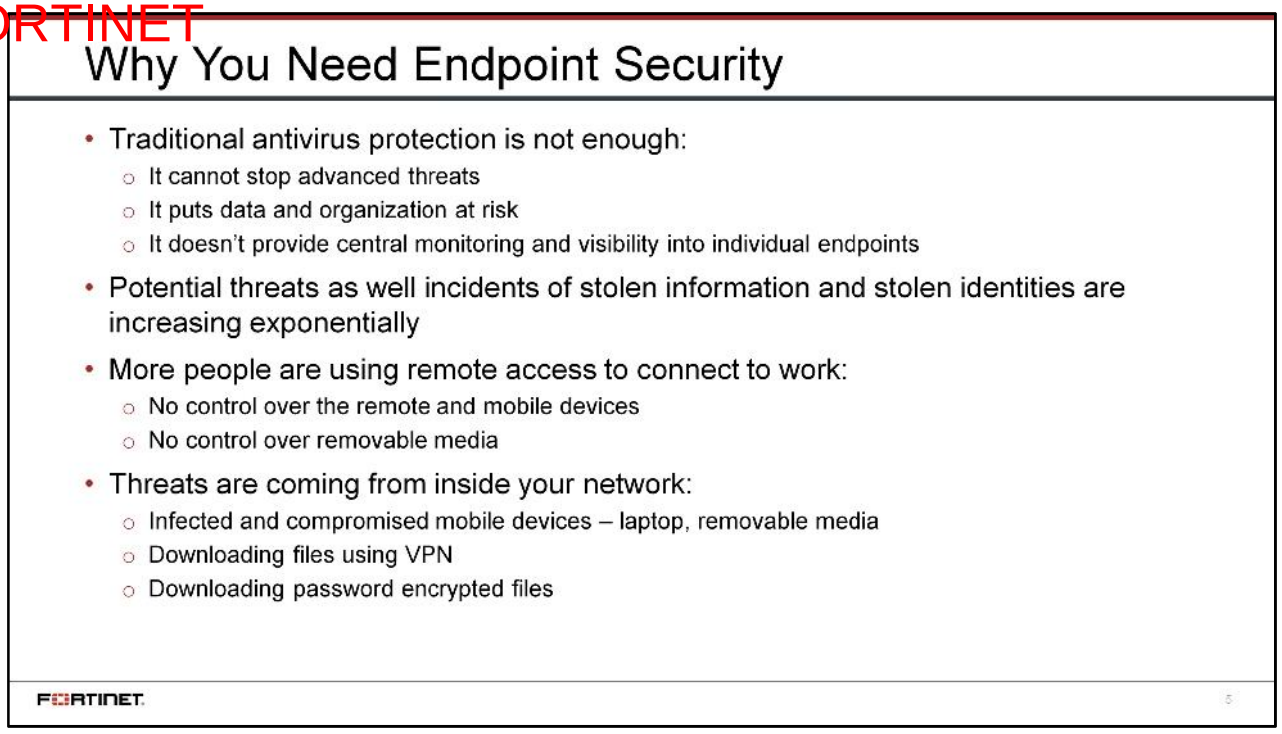
In a typical endpoint network security solution, multiple instances of single-purpose software applications are used. Each application provides a specific service, including:

- Antivirus protection
- Web filtering
- VPN access
- Application firewall

Many endpoint security solutions are not capable of providing central management, central logging, and other features.

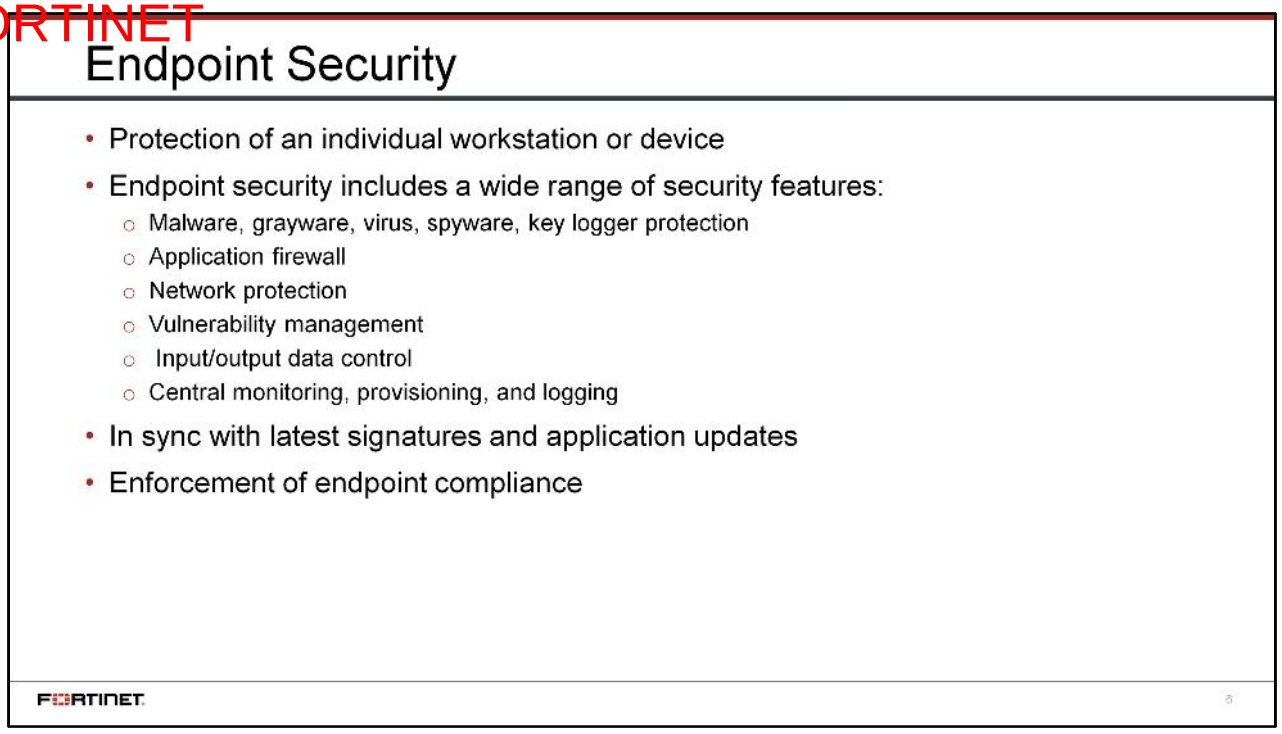
When several different applications are used, most times, they all are made by different vendors. Using applications from multiple vendors can introduce unwanted complexity, create many potential points of failure, and increase the cost of initial installation and ongoing operation.

On the other hand, FortiClient offers comprehensive endpoint protection for your Windows-based and Mac-based desktops, laptops, file servers, and mobile devices. FortiClient can safeguard your systems with advanced security technologies and provide a single management console.

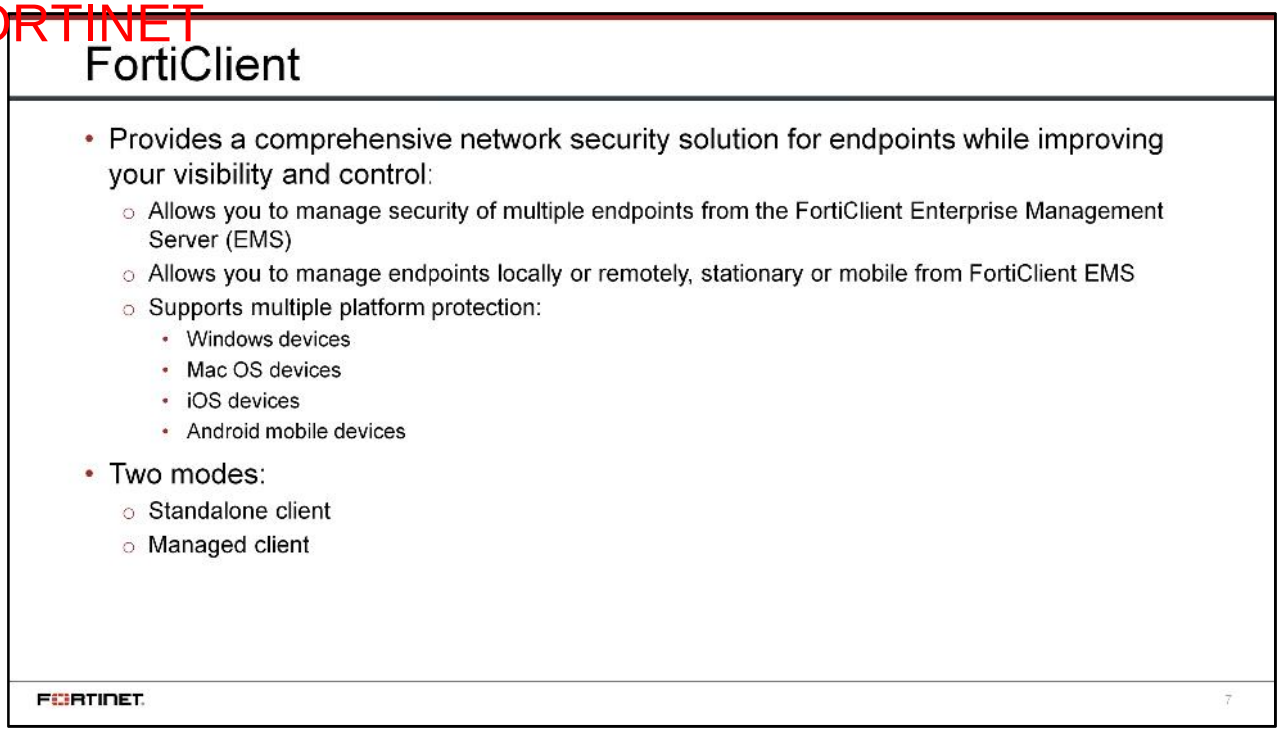


Traditional antivirus software can protect your endpoints from known viruses, but may be unable to detect and protect against advanced threats. This can result in data being lost or compromised. Present day attackers us advanced methods to hijack your identity, such as social media accounts and access your banking information. Sometimes, this information is browser based or application based, and antivirus software can do a little to protect it.
More and more people connect to corporate networks from Wi-Fi hotspots, and providing no control over remote or mobile devices.
Not only do threats come from outside network, people often bring mobile devices inside your network, which may be compromised, and they use your VPN to download files which may be contain potential issues.

This is why you need endpoint security!



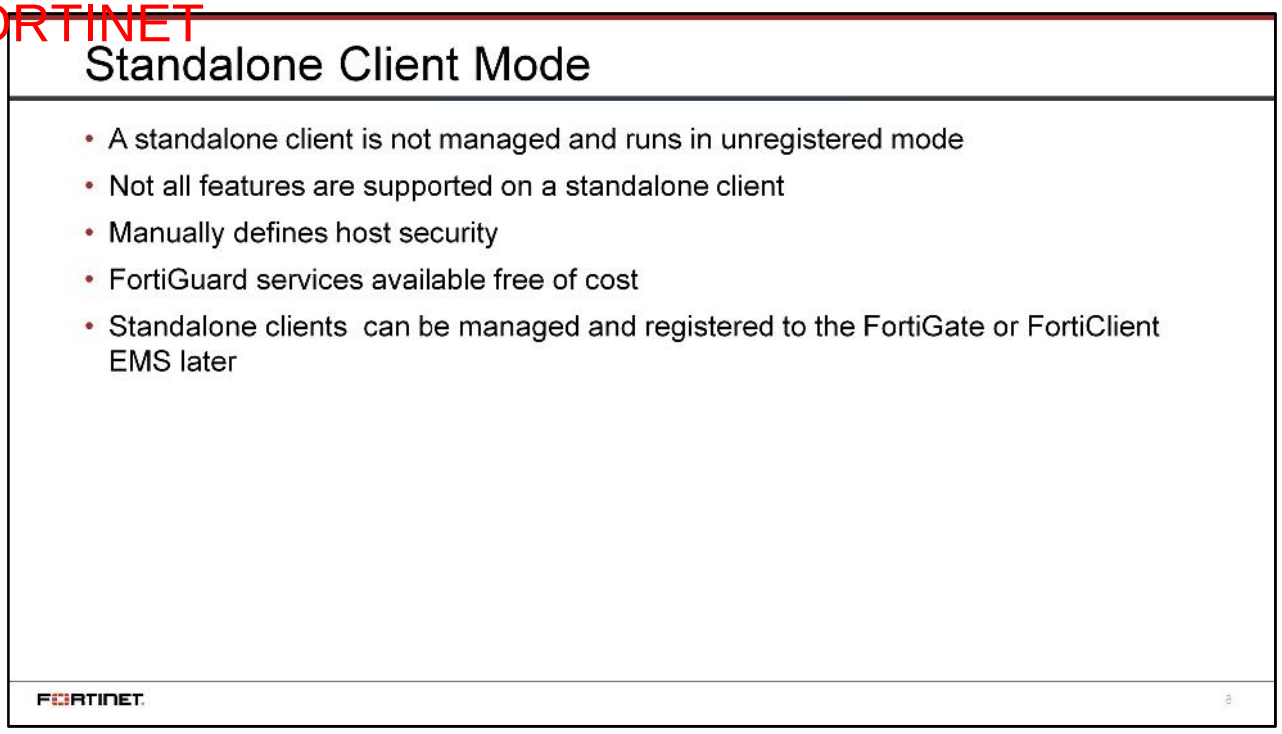
Standard security software can provide basic protection, but endpoint security provides basic security plus much more. Endpoint security provides an antivirus program and much more to protect your devices and it creates barrier between your network and the outside. Endpoint security provides antivirus updates, antimalware, IPS/IDS signatures, and updates.
Endpoint security also forces endpoint compliance, which requires endpoints devices to comply with specific criteria before they can gain access to the network.



FortiClient provides comprehensive endpoint protection for your Windows-based and Mac-based desktops, laptops, file servers, and mobile devices. It helps you to safeguard your systems with advanced security technologies, all of which you can manage from a single management console.

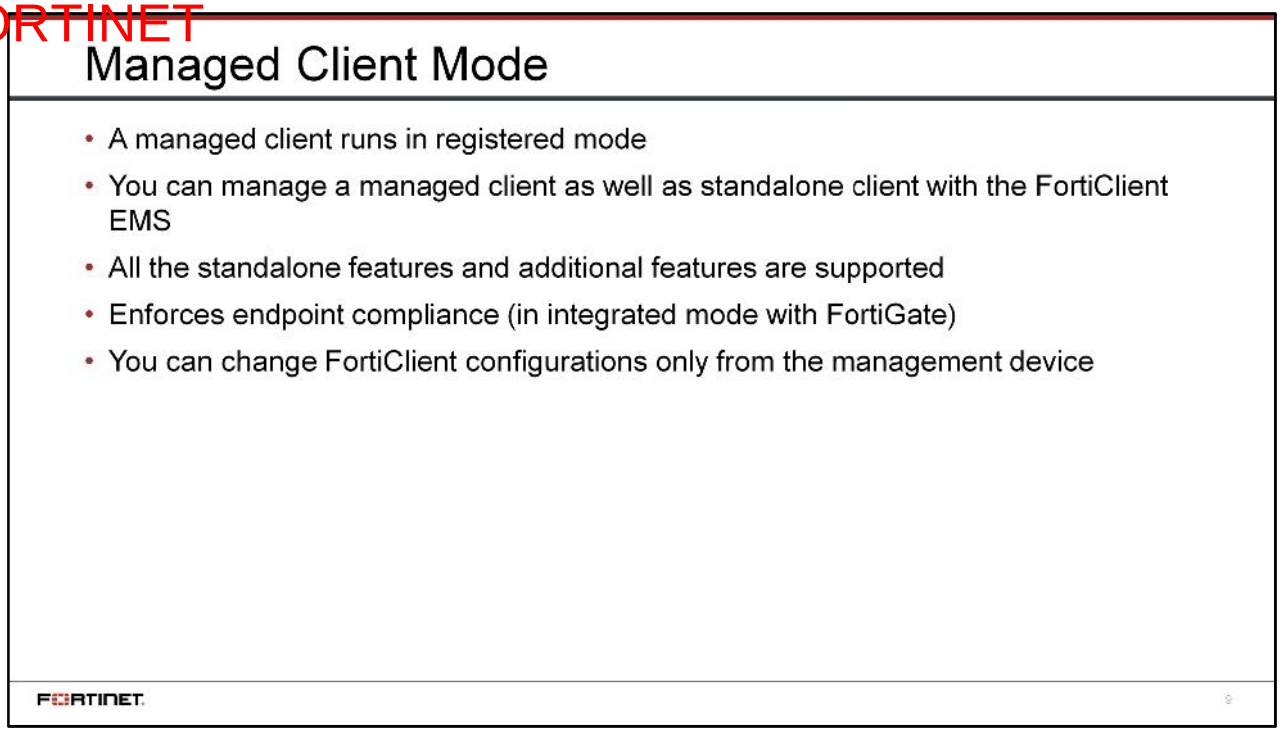
FortiClient enables every device—local or remote, stationary or mobile—to integrate with your FortiGate and FortiClient EMS. FortiClient supports Windows, Mac OS X, iOS, and Android mobile devices, and also integrates your home offices, mobile workers, and visiting partners.

FortiClient can operate in two modes–standalone client and managed client. You will learn about both operating modes in this lesson.



You can use FortiClient as a standalone client. Standalone client is the free client download that can run in an unregistered mode, delivering a comprehensive solution to devices that are not managed.

Standalone client doesn't support all features. You can register a standalone client to FortiClient EMS, in order to provision full features. You can make configuration changes locally.

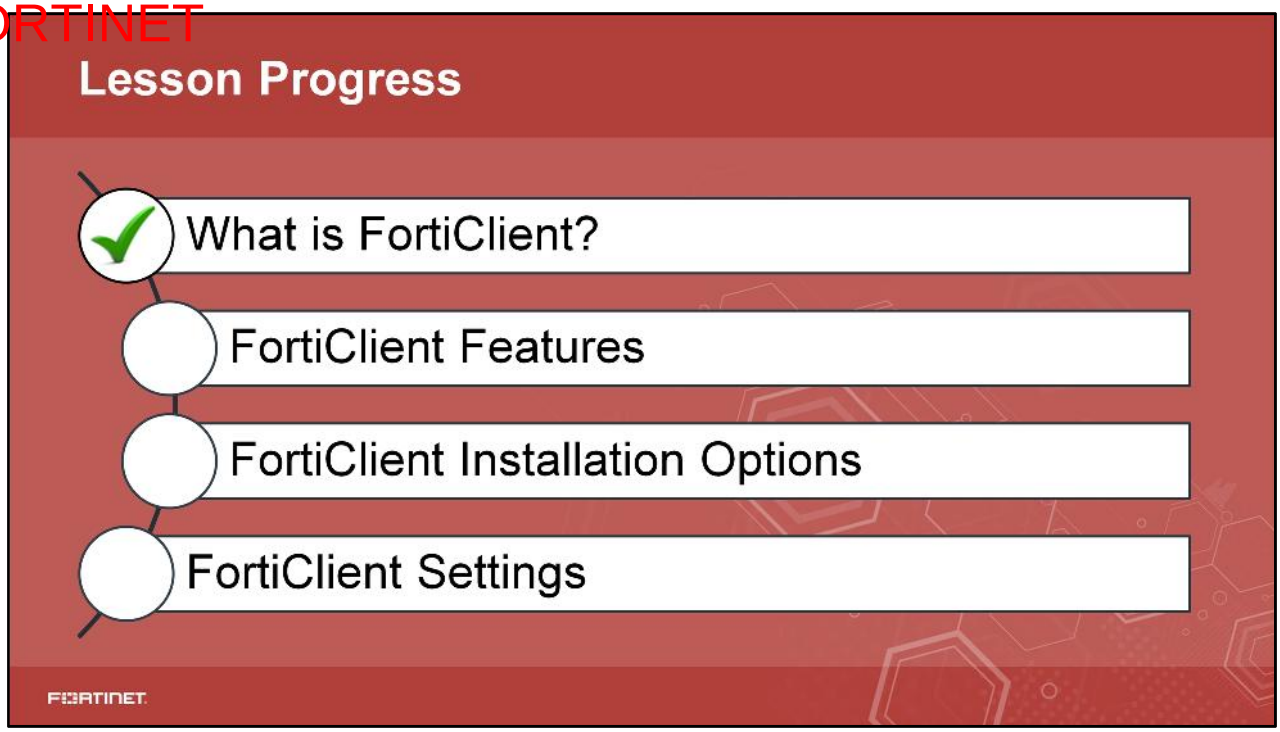


In order for the FortiClient to be managed, it needs to registered to FortiClient EMS. After you have registered the managed client, you can enable additional features, such as application control, vulnerability management, and more, from the FortiClient EMS. You can also enforce endpoint compliance, which forces users to download and install FortiClient and push configuration from FortiClient EMS. On managed clients, configuration changes are grayed out locally on the FortiClient and can be changed only from a managed device.

Knowledge Check

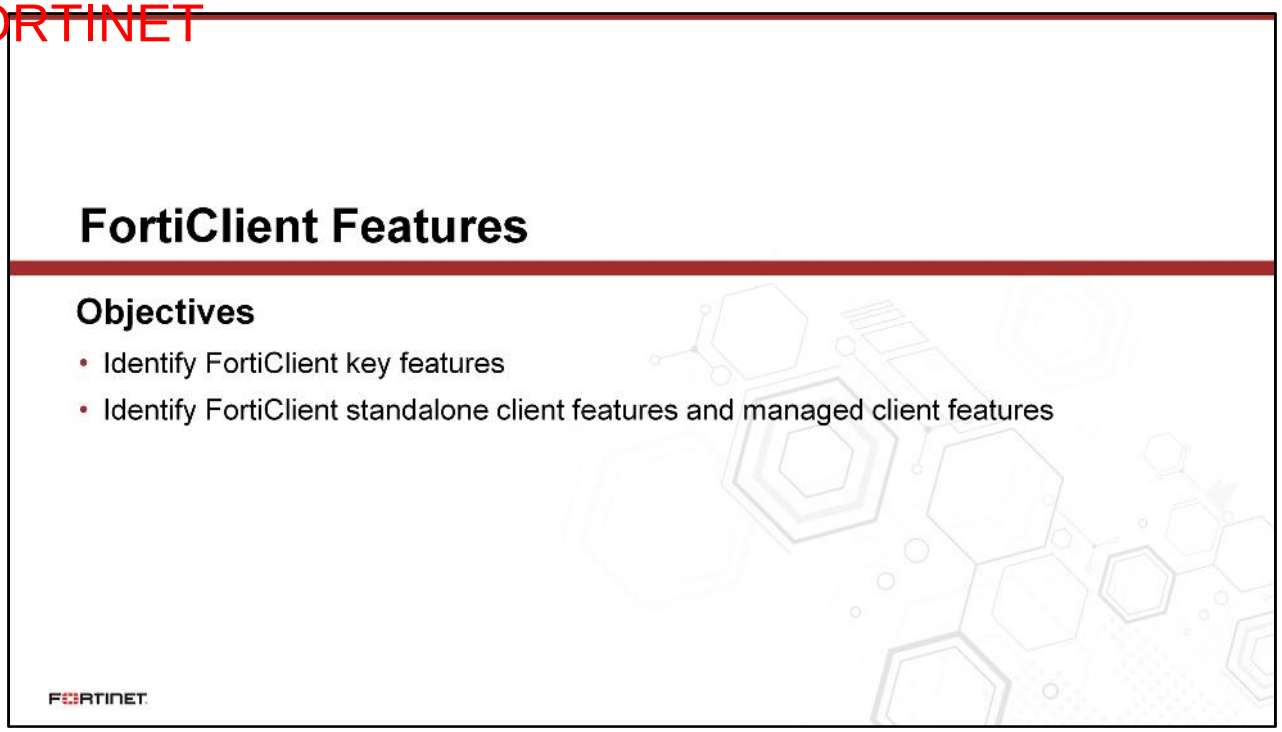
1. What is endpoint security?
   A. Traditional antivirus software
   ✓ B. A comprehensive network security solution for endpoints

2. Which of the following are the two FortiClient operation modes?
   ✓ A. Standalone client and managed client
   B. Standalone client and hybrid client



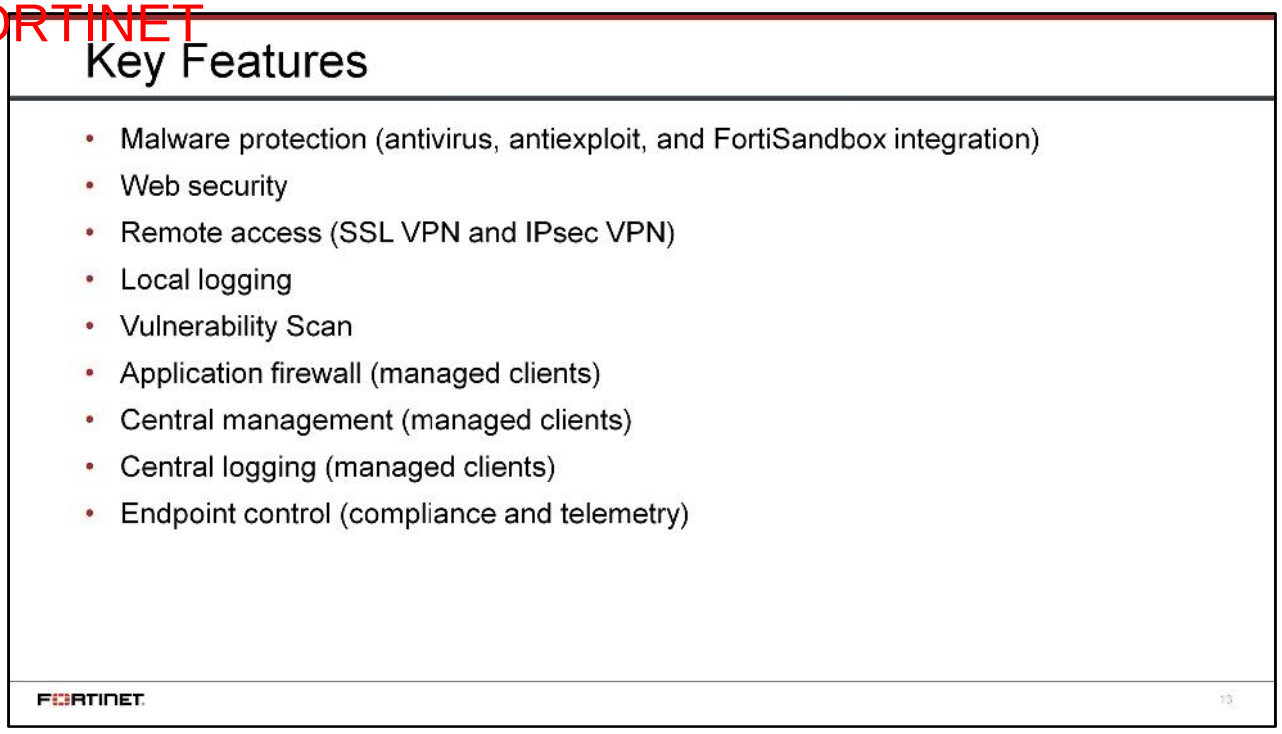
Good job! You now know more about what FortiClient is and what it does.

Now, you will learn about FortiClient features and what they do.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in understanding the key features of FortiClient and features of both standalone client and managed client operation modes, you will be able to use FortiClient features and operation modes in your network.

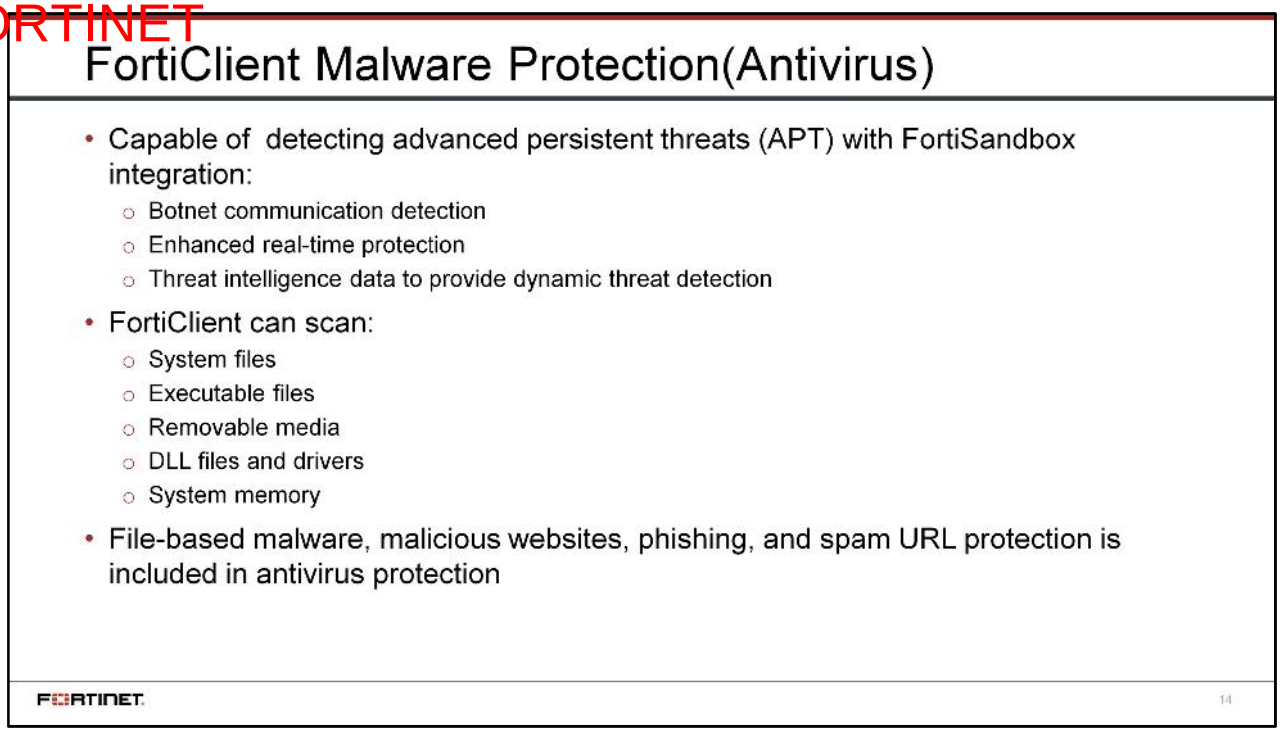


The standalone client (unregistered free version) supports many features. Some of FortiClient features are available on only managed clients (registered clients).

FortiClient key features include:

Malware protection
Web filtering
VPN–SSL VPN and IPsec VPN
Local logging
Vulnerability scan
Application firewall (managed client, licensed version only)
Central management (managed client, licensed Version only)
Central logging (managed client, licensed version only)

Note that, by default, FortiGate and FortiClient EMS supports up to 10 free clients to be managed. To manage additional clients, you must purchase FortiClient licenses. You will learn more about FortiClient licenses in another lesson.



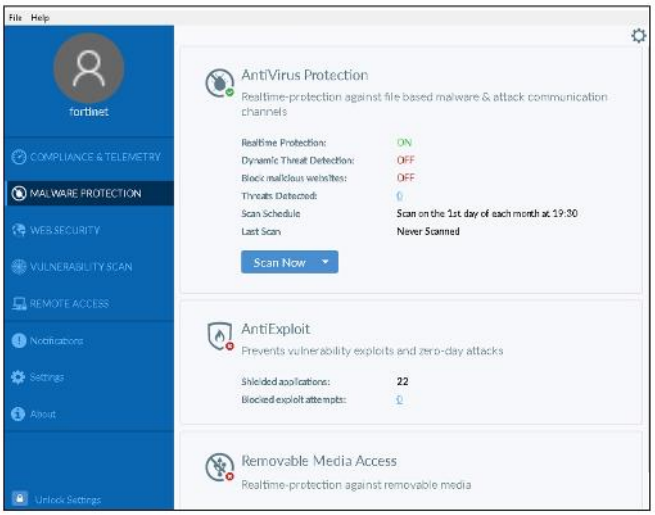
FortiClient has enhanced capabilities for the detection of APT with FortiSandbox integration. These enhanced capabilities include:

- **Botnet command and control communications detection**: When you enable the botnet feature, FortiClient monitors and compares network traffic on a compromised system with a list of known command and control servers, and blocks it.
- **FortiSandbox integration (Windows only)**: You can configure FortiClient to send suspicious files to FortiSandbox, if they could not be detected by local real-time scanning. Access to the downloaded files are blocked until scanning results are returned. As FortiSandbox receives files for scanning, it collects and generates antivirus signatures for such samples. FortiClient periodically downloads the latest antivirus signatures from the FortiSandbox and applies them locally to all real-time, as well as on-demand, antivirus scanning.
- **Enhanced real-time protection implementation (Windows only)**: The real-time protection (RTP) feature on FortiClient uses tight integration with Microsoft Windows to monitor files locally or over a network file system, as they are being downloaded, saved, run, copied, renamed, opened, or written to.

FortiClient can scan system files, executable files, removable media, dynamic-link library (DLL) files, memory, and drivers. FortiClient also scans for and remove rootkits. File-based malware, malicious websites, phishing, and spam URL protection is part of the antivirus module.

Antivirus Dashboard

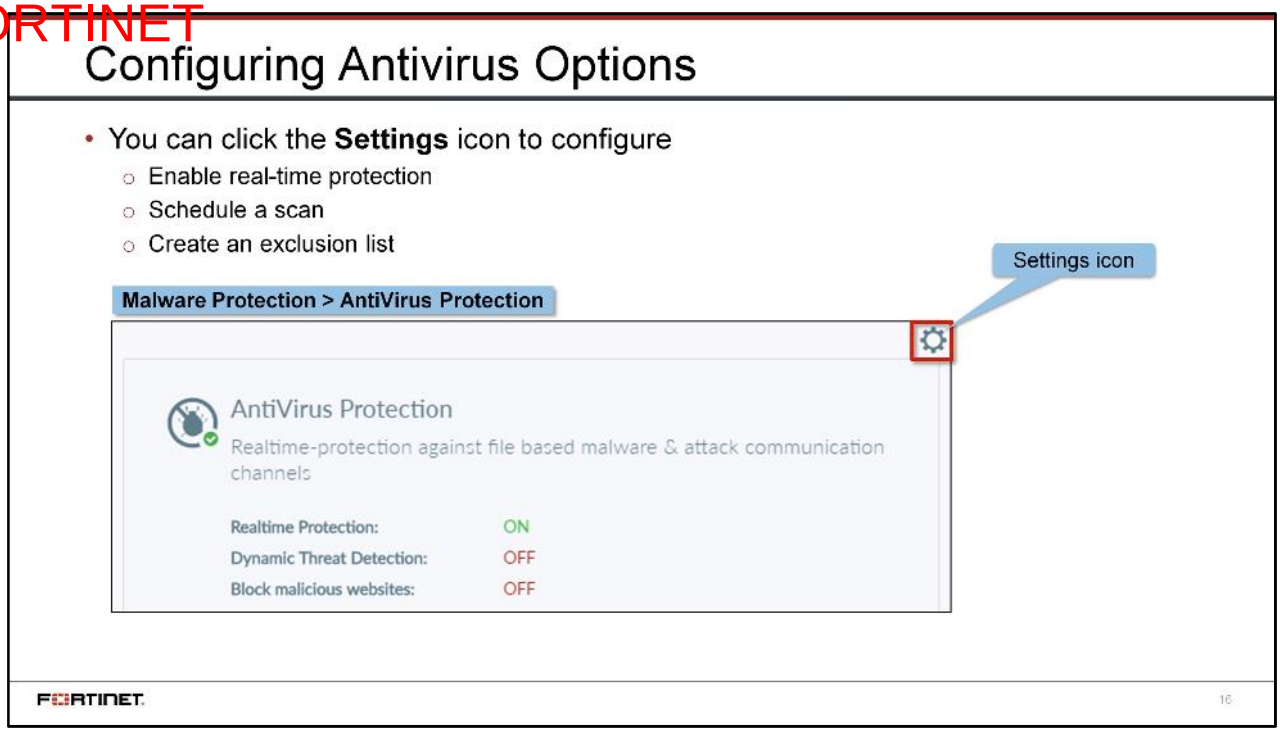
- Settings
  - View and configure real-time protection
  - Show the status of the database
  - Initiate a scan on demand
- By default, only the **Realtime Protection** option is enabled except for Windows Server endpoints



FORTINET 15

Now that you know more about what antivirus capabilities on FortiClient, you will learn more about the available antivirus options.

You can view and configure the real-time protection status, view if database is up-to-date, or perform on-demand antivirus scan.
You will learn more about each of these options in detail in this lesson.



You can click the **Settings** icon to access and configure most of the antivirus options. These options include::

- **Realtime Protection**: You can configure settings to specify what to scan. When a virus is detected during real-time monitoring, it will be automatically quarantined. If you have another antivirus program installed, FortiClient will display a warning message stating that your system may lock up or become unstable due to conflicts between the different antivirus products. It is recommended that you uninstall all conflicting antivirus software before installing FortiClient or enabling antivirus real-time protection.
- **Scheduled Scan**: You can enable scheduled antivirus scans that will automatically scan your workstation at a scheduled time.
- **Exclusions**: You can create an exclusion list that includes files or folders on which you don't want run an antivirus scan.

Configuring Realtime Protection Settings

- You can use real-time protection settings to:
  - Scan files as they are downloaded or copied to my system
  - Block all access to malicious websites
    - You must also enable web filter on FortiClient
  - Block known communication channels used by attackers

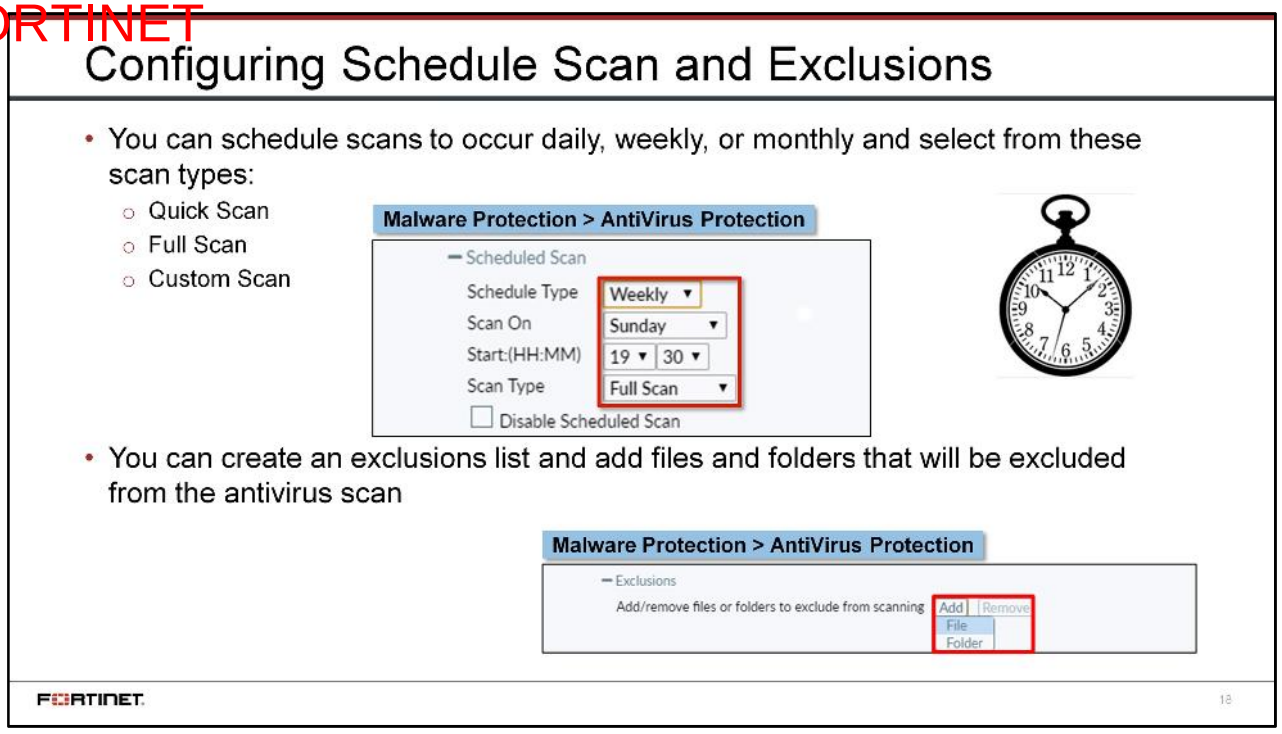
FORTINET 17

You can select or clear the following realtime protection settings::

- **Scan files as they are downloaded or copied to my system**
- **Dynamic threat detection using threat intelligence data**
- **Block malicious websites**
- **Block known attack communication channels**

To enable real-time protection, you must select **Scan files as they are downloaded or copied to my system**. Why?

When you download software from the Internet, there is always a chance that you could download applications or programs that will try to inject malware, grayware, or viruses in to your system. To protect your system in real-time, you must enable **Scan files as they are downloaded or copied to my system**.



You can configure daily, weekly, and monthly scans as well as selecting one of the following scan types:

- **Quick Scan**: It only scans executable files, DLLs, drivers that are currently running for threats.
- **Full Scan**: It performs a full system scan including all files, executable files, DLLs, and drivers for threats.
- **Custom Scan**: It allows you to select a specific file folder on your local hard disk drive (HDD) to scan for threats.

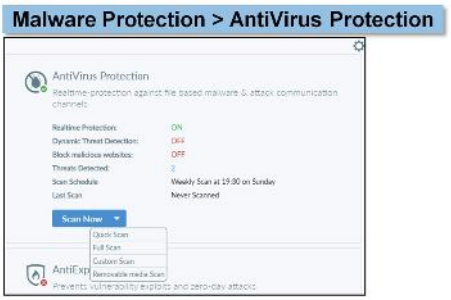
All three scan types runs the rootkit detection engine to detect and remove rootkits.
By default, FortiClient is scheduled to rum full system scans monthly. It is recommended that you run a full system scan on your endpoint as specified by default setting. Using the default settings provides the best balance between protecting your endpoint from network threats and supporting the best overall performance. If the default settings does not meet your needs, you can always adjust and fine-tune settings accordingly.

Note that if you configure monthly scans to occur on the 31st of each month, the scan will occur on the first day of the month for those months with less than 31 days.

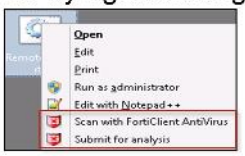
You want to exclude certain files or folders from the antivirus scan, but still want to perform an antivirus scan on rest of the system, you can configure an exclusions list. The files and folders that you add to this list will be excluded from antivirus scanning.

On-Demand Antivirus Scanning

- You can click the Scan Now button to configure on-demand antivirus scanning. You can select from these scan types:
  - Custom Scan
  - Full Scan
  - Quick Scan
  - Removable Media Scan



- You can scan specific file or folder and submit a file for analysis by right clicking that file on your workstation
  - You can submit up to 5 files a day to FortiGuard for analysis
  - SMTP port is used to upload files



FORTINET 19

You can run on-demand antivirus scan. Scan types include:

Custom Scan

- Runs the rootkit detection engine to detect and remove rootkits. It allows you to select a specific file folder on your local hard disk drive (HDD) to scan for threats

Full Scan

- Runs the rootkit detection engine to detect and remove rootkits. It then performs a full system scan of all files, executable files, DLLs, and drivers

Quick Scan

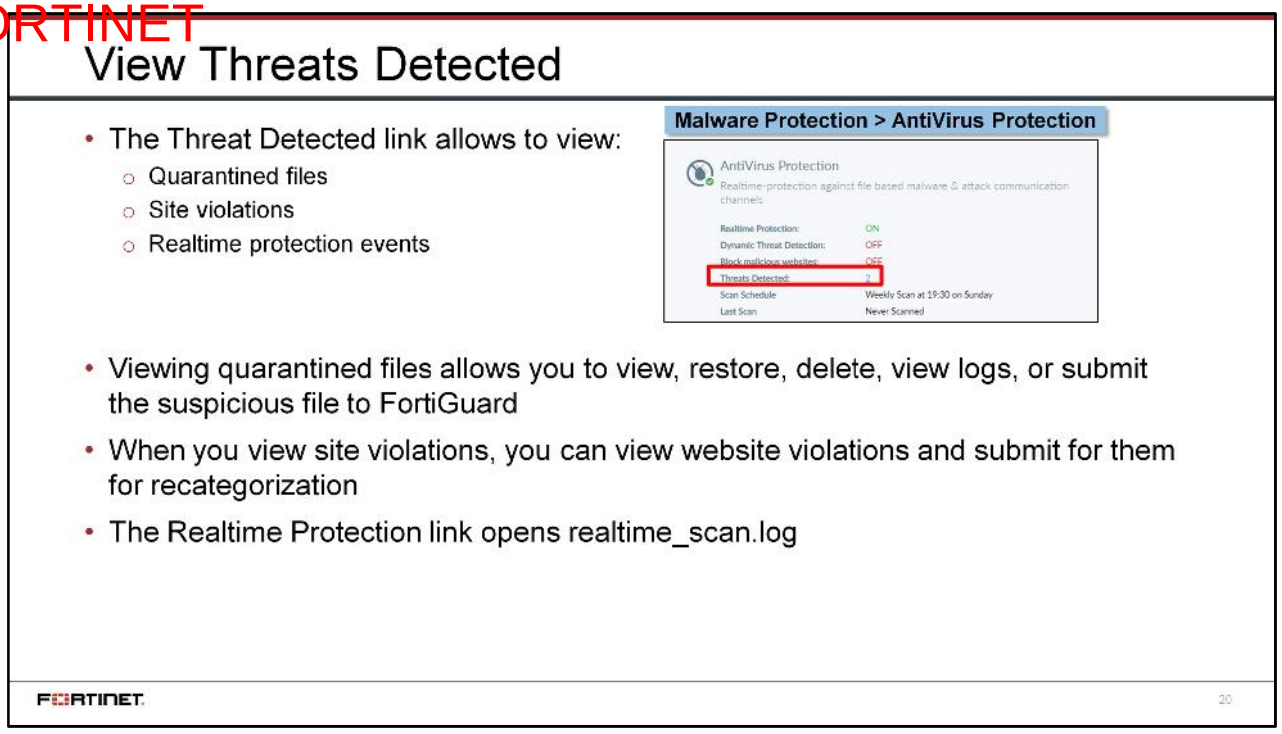
- Runs the rootkit detection engine to detect and remove rootkits. It only scans the following items for threats: executable files, DLLs, and drivers that are currently running

Removable Media Scan

- You cannot schedule a removable media scan. A full scan will scan removable media

You can view the date of last scan run. You can perform a virus scan on a specific file or folder on your workstation by right-clicking the file or folder and selecting **Scan with FortiClient AntiVirus** and **Submit for analysis**. You can submit up to five files per day for analysis. FortiClient use SMTP port 25 to upload files, port must be open on network firewall. The FortiGuard team does not provide feedback for the files submitted but creates signatures for the malicious files detected.

Note that the **Submit for Analysis** option is only available when you select an individual file.

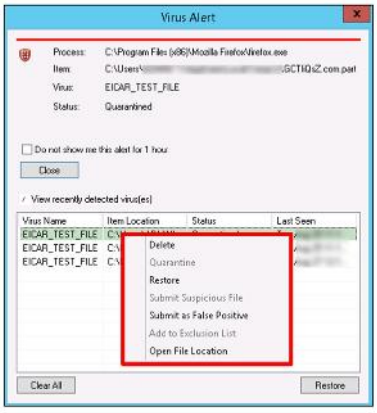


The Threat Detection link allows you to view quarantined threats, site violations, and real-time protection events. Each link provides further information about the threat or violation.

- **Quarantined Files**: It allows you to view, restore, or delete the quarantined file. You can also view the original file location, the virus name, submit the suspicious file to FortiGuard, and view logs.
- **Site Violations**: It allows you to view site violations, which are part of FortiClient antivirus, and submit requests to have the site to recategorized. It allows you to view site violation details, including the website name, category, date and time, user name, and status.
- **Realtime Protection events**: When an antivirus real-time protection event occurs, it is logged in `realtime_scan.log` and can be opened in any text editor. By default, realtime protection events open in the default viewer.

Virus Alert

- A warning message opens when a virus is detected while downloading file via web-browser.
  - Automatically quarantine the file
  - Right click on a file to access context menu



FORTINET 21

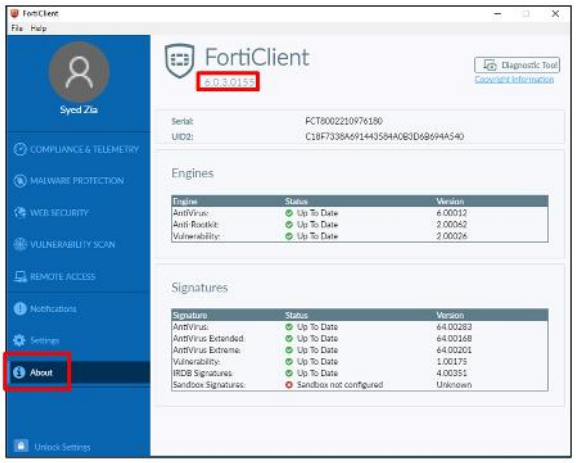
If FortiClient detects a virus file that is being downloaded through a web browser, FortiClient presents a warning message and automatically quarantines the virus file. If you right-click the quarantined file, you can take the following actions:

- **Delete**: You can delete a quarantined or restored file.
- **Quarantine**: You can quarantine a restored file.
- **Restore**: You can restore a quarantined file, and also allows you to add to Exclusion list.
- **Submit Suspicious File**: You can submit a file to FortiGuard as a suspicious file.
- **Submit as False Positive**: You can submit a quarantined file to FortiGuard as a false positive.
- **Add to Exclusion List**: You can add a restored file to the exclusion list. Any files in the exclusion list will not be scanned.
- **Open File Location**: You can open the file location on your workstation.

Note that if you did not select the **Alert when viruses are detected**, you will not receive the virus alert dialog box when attempting to download a virus in web browser.

FortiClient Engine and Signature Version

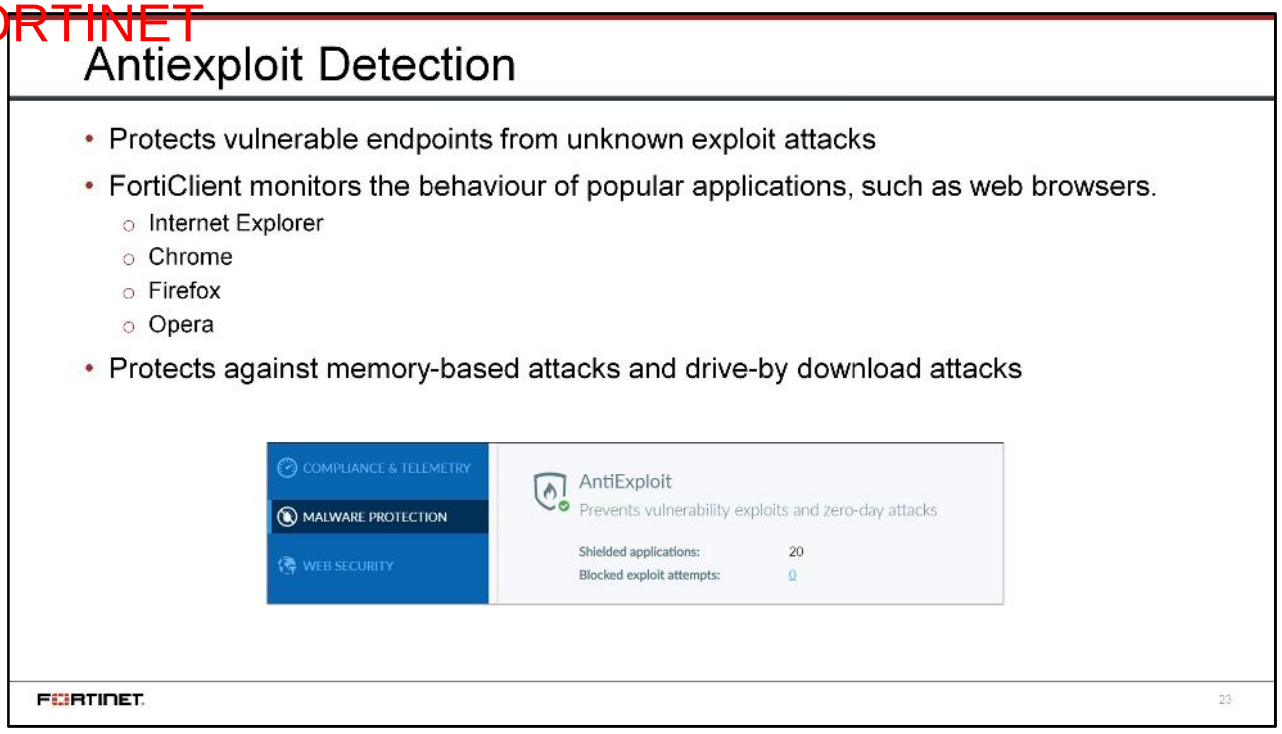
- You can view FortiClient engine and signature versions



FORTINET 22

You can view the current FortiClient version, engine, and signature information by selecting **About**.

You can use FortiManager for client software and signature updates when registered to FortiGate or EMS.



The antiexploit detection protects vulnerable endpoints from unknown exploit attacks. FortiClient monitors the behaviour of popular applications, such as web browsers (Internet Explorer, Chrome, Firefox, Opera), Java/Flash plug-ins, Microsoft Office applications, and PDF readers, to detect exploits that use zero-day or unpatched vulnerabilities to infect the endpoint. Once detected, FortiClient terminates the compromised application process.

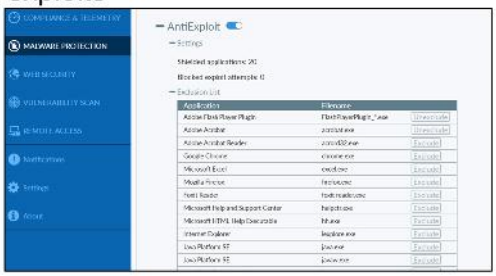
The antiexploit detection feature also protects endpoint from memory-based attacks and drive-by download attacks. It also detects and blocks unknown and known exploit kits.

It is a signature less solution.

Antiexploit Detection (Contd)

- You can view the exploit attempts FortiClient has blocked

- You can view applications protected from exploits



FORTINET 24

You can determine which applications are protected from exploits based on the buttons beside their names.

Applications with an **Exclude** button beside their names are protected from evasive exploits.

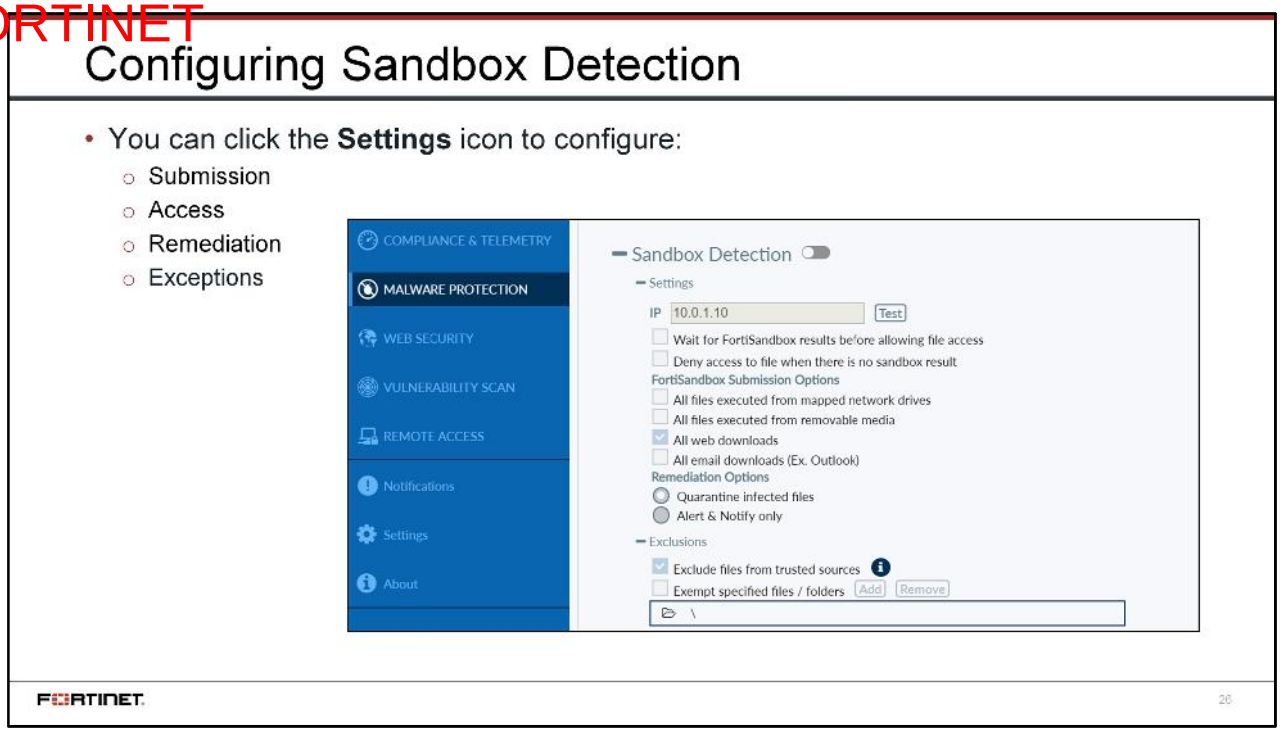
Applications with an **Unexclude** button beside their names are not protected from evasive exploits. You can protect the application by clicking the **Unexclude** button.

Sandbox Detection

- FortiClient supports integration with FortiSandbox
- FortiClient sends files to FortiSandbox for further analysis if they are not detected locally
- Endpoint users can also manually submit files to FortiSandbox for scanning
- Access to files can be blocked until the FortiSandbox scanning result is returned

FortiClient supports integration with FortiSandbox. When configured, FortiSandbox automatically scans files downloaded on the endpoint, or from removable media attached to the endpoint, or mapped network drives. FortiClient also automatically scans files downloaded with an email client on the endpoints, or from the Internet.

In each case, if the file is not detected locally, and FortiSandbox integration is configured, FortiClient sends the file to the FortiSandbox for further analysis. Endpoint users can also manually submit files to FortiSandbox for scanning. Access to files can be blocked until the FortiSandbox scanning result is returned. When scanning is complete, FortiSandbox can quarantine infected files, or alert and notify the endpoint user of infected files without quarantining the files.



You can click the **Settings** icon to access and configure sandbox options. These options include:

- **Wait for FortiSandbox results before allowing file access:** Select to wait for FortiSandbox analysis results before files can be accessed.
- **Deny Access to file when there us no sandbox result:** Select to deny access to files when FortiClient cannot reach FortiSandbox for file analysis or no result.

You can configure the following FortiSandbox submission options:

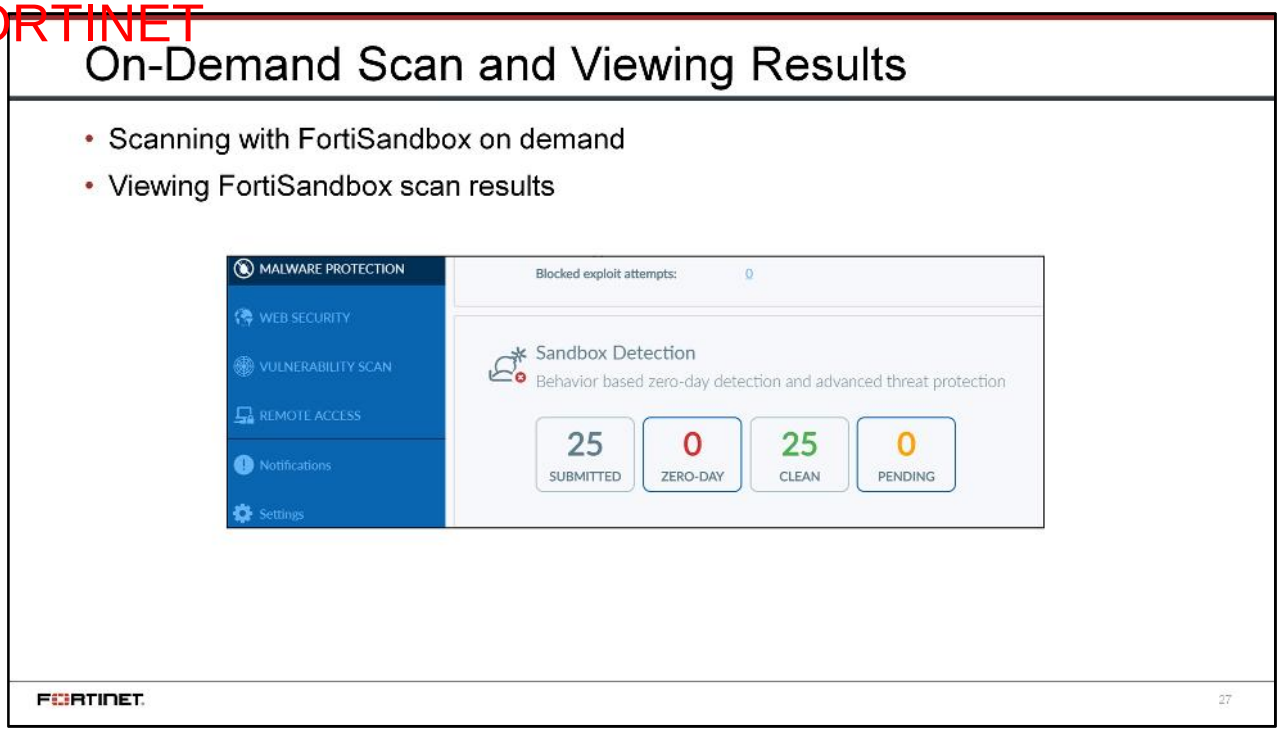
- **All files executed from mapped network drives:** Select to submit all files that are executed on mapped network drives to FortiSandbox for analysis. Clear the checkbox to disable this feature.
- **All files executed from removable media:** Select to submit all files executed on removable media, such as USB drives, to FortiSandbox for analysis. Clear the checkbox to disable this feature.
- **All web downloads:** Select to submit all web downloads on the endpoint to FortiSandbox for analysis.
- **All email downloads (Ex. Outlook):** Select to submit all email downloads on the endpoint to FortiSandbox for analysis.

You can configure the following remediation options:

- **Quarantine infected files:** Select to quarantine infected files.
- **Alert & Notify only:** Select to alert and notify the endpoint user about infected files, but not quarantine infected files.

You can configure the following exclusion options:

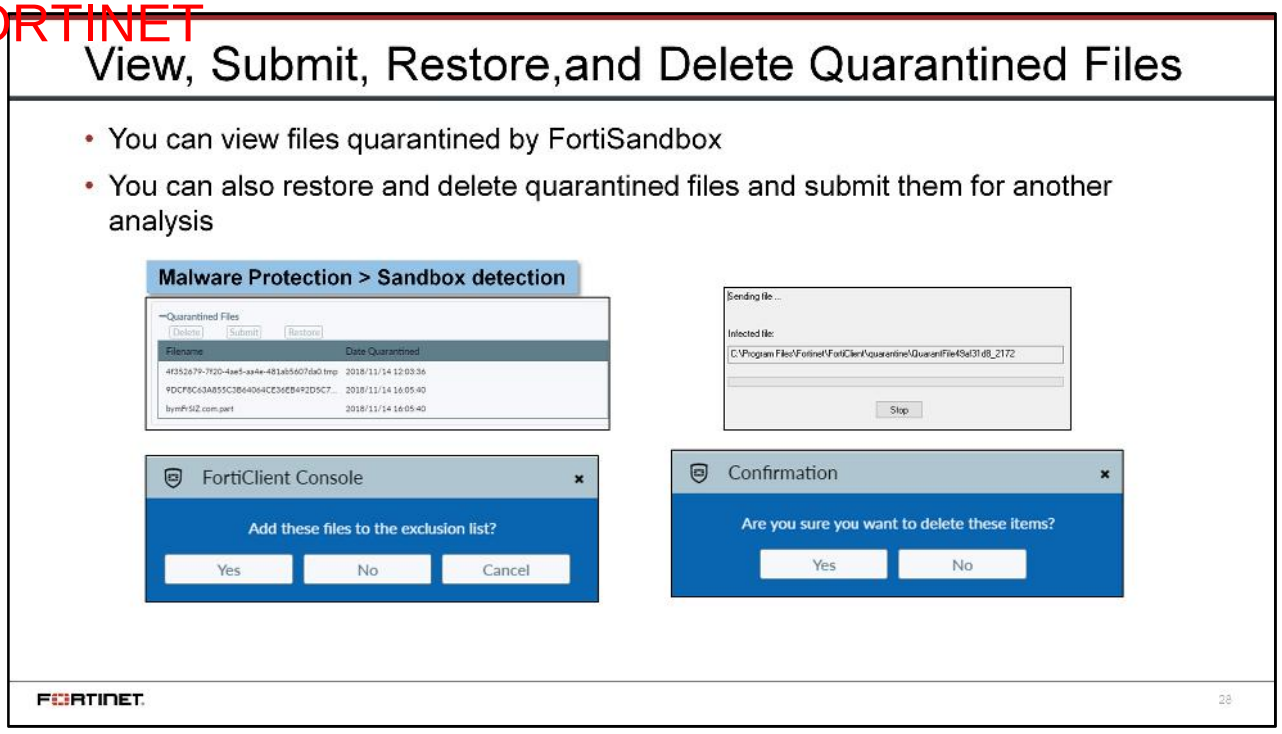
- **Exclude files from trusted sources:** Select to exclude files from trusted sources from FortiSandbox analysis.
- **Exempt specified files / folders:** Select to exempt specified files and/or folders from FortiSandbox analysis. You must also create the exclusion list.



You can send files to FortiSandbox for scanning on demand when FortiSandbox is enabled and online.

FortiSandbox scan results display on the **Malware Protection** page. When a virus is detected, FortiClient creates a notification alert that displays the following information:

Submitted: The number of files submitted to FortiSandbox for scanning.
Zero-day: The number of detected zero-day files.
Clean: The number of files determined clean after FortiSandbox scanning.
Pending: The number of files waiting for FortiSandbox scanning.



You can view files quarantined by FortiSandbox. You can also restore and delete quarantined files.

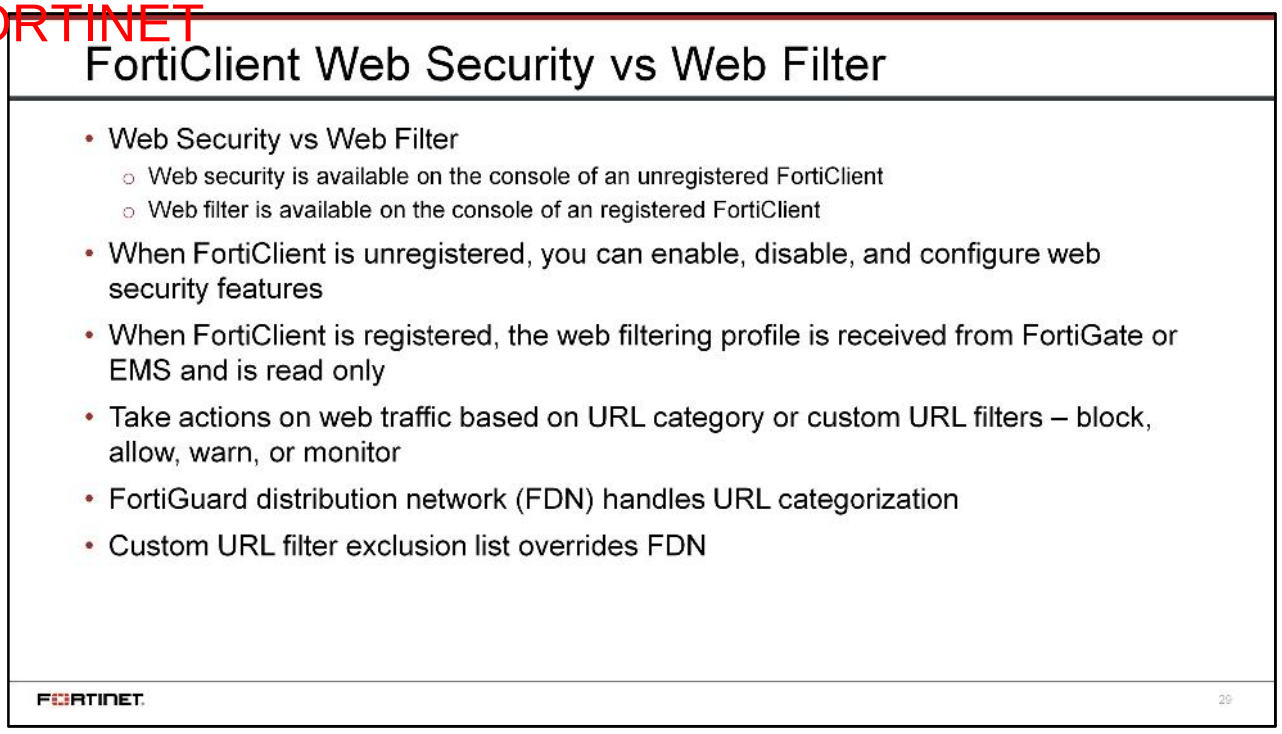
Endpoint users can only restore and delete quarantined files with FortiClient in standalone mode. When you restore a quarantined file, you can choose whether to add the file to the exclusion list. You can submit quarantined files to FortiSandbox for scanning.

The maximum age for quarantined files is specified in the `<quarantine></quarantine>` XML tags:

```
<forticlient_configuration>
<antivirus>
<quarantine>
<cullage>100</cullage>
</quarantine>
</antivirus>
</forticlient_configuration>
```

The `<cullage>` XML tag specifies how long to hold quarantined files, in days, before deleting them. A number from 1 to 365. Default value is 100 days

Note that you cannot restore and delete quarantined files when FortiClient is in managed mode.

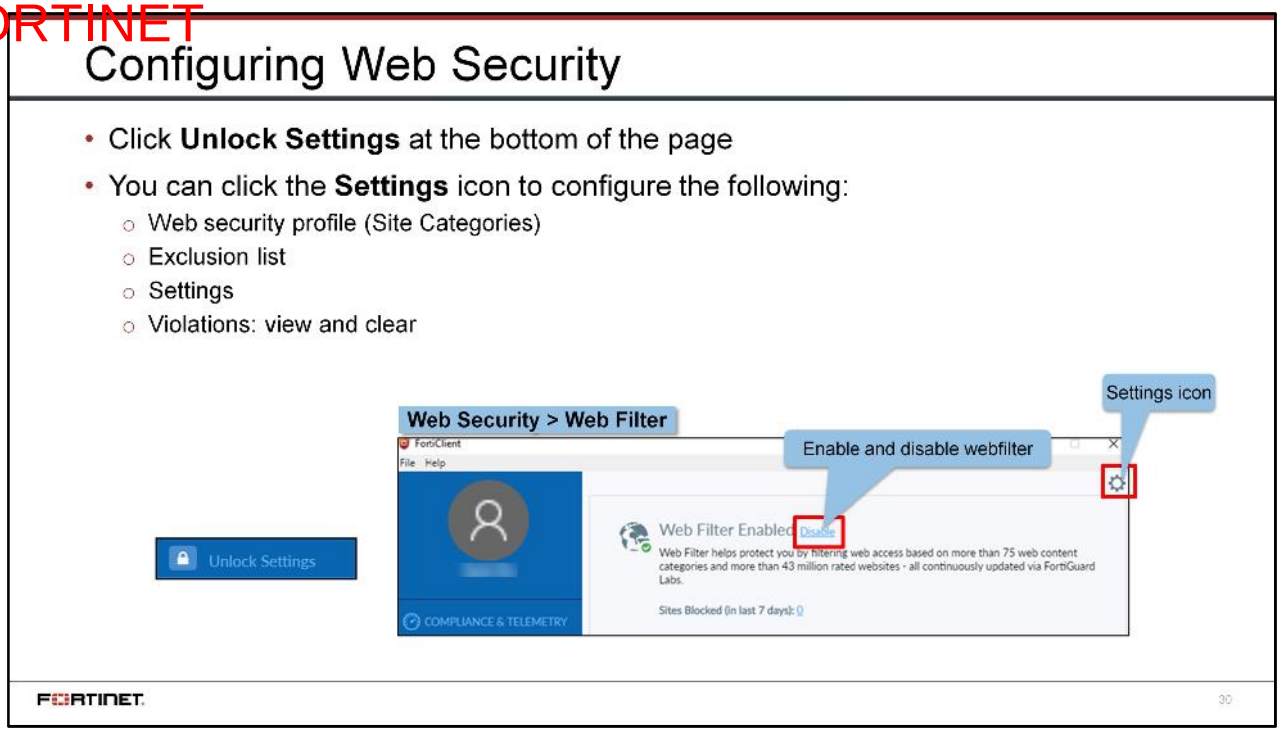


On an unregistered (standalone) FortiClient, you can configure web security features on the FortiClient console. On a FortiClient that is registered to FortiGate or EMS, you view the web filtering profile from the FortiClient console.

When FortiClient is not registered to FortiGate or EMS, you can enable or disable web security features. You can define what sites are allowed, blocked, or monitored, and view violations.
When FortiClient is registered to FortiGate or EMS, web filter configuration settings are pushed from the management device and are read only on the FortiClient console.

If FortiClient is registered with FortiGate, you can web filter compliance policy by clicking a **Fix** button that displays on FortiClient.

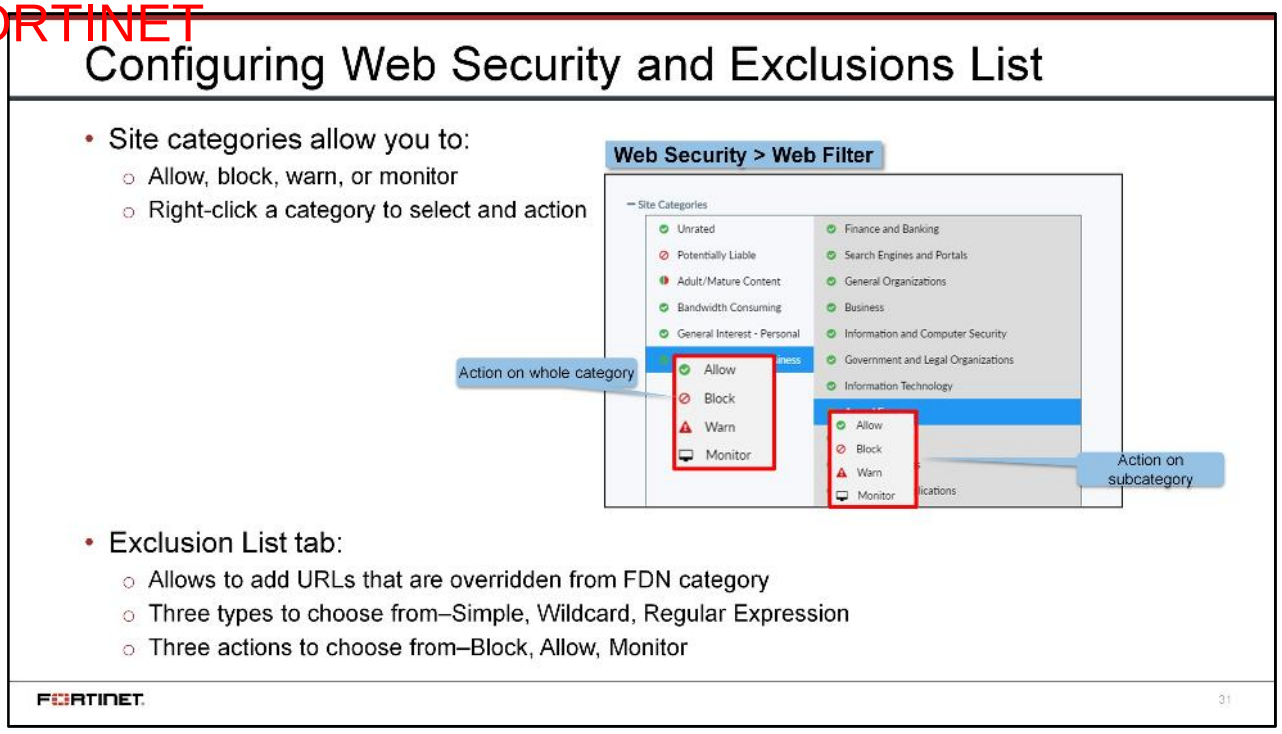
Web security and web filter features allow you to block, allow, warn, and monitor web traffic based on URL category or custom URL filters. URL categorization is handled by the FDN. You can create a custom URL filter exclusion list which overrides the FDN category.



From FortiClient version 6.0, all the settings are locked by default. You can unlock settings by Clicking **Unlock Settings**.

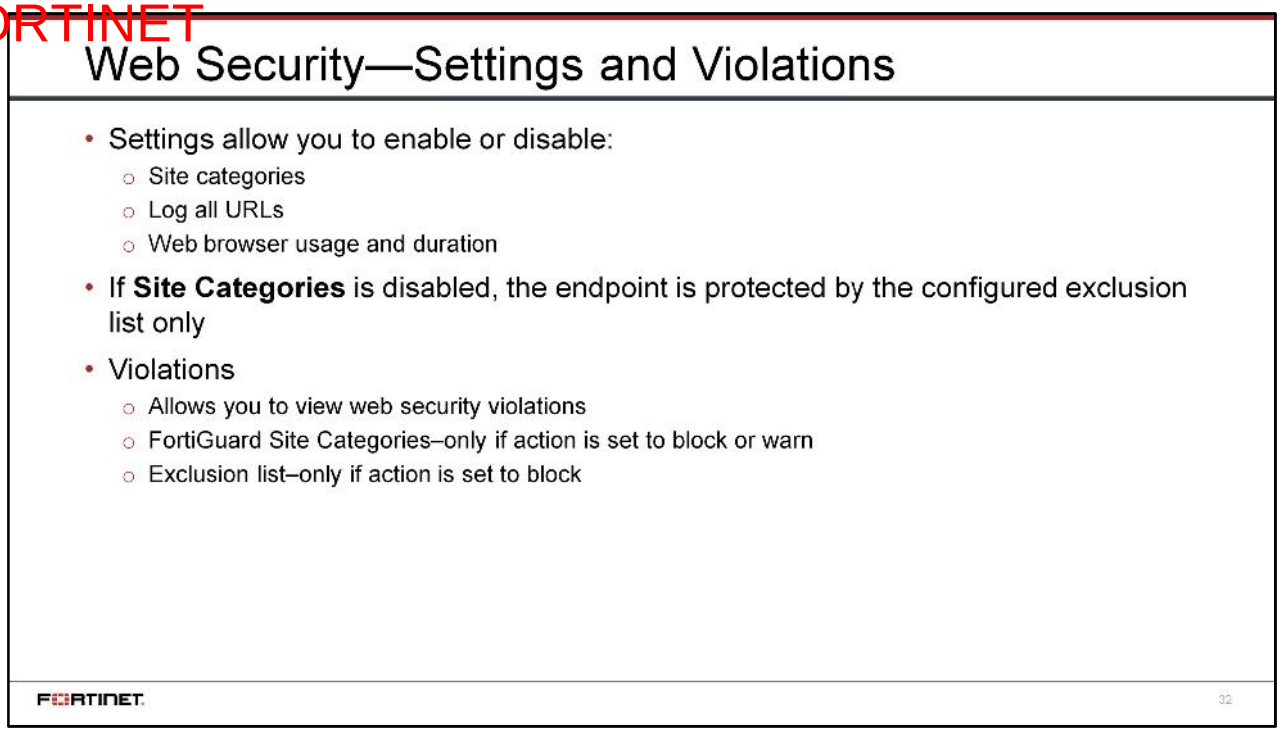
You can enable and disable web security feature from clicking to toggle between Enable and Disable link. Web security is enabled by default.

You can configure most web security options by clicking the **Settings** icon. Configurable options include:
- Web security profile (site categories)
- Exclusion List
- Settings
- Violations



You can configure a web security profile to allow, block, warn, or monitor web traffic based on website categories and subcategories.
Allow: Permits access to the sites within the category.
Block: Prevents access to sites within the category. Users attempting to access a blocked site will receive a replacement message explaining that access to the site is blocked.
Warn: Presents the user with a message, allowing them to continue if they choose. Accepting a disclaimer will allow users to browser the override category for 5 minutes.
Monitor: Permits and logs access to sites in the category. You may also enable user quotas when enabling the monitor action.

What if you want to exempt a URL that is part of category, but you still want to take action on that category as a whole?
You can configure an exclusion list to which you can add websites and set the permissions to allow, block, and monitor. You can configure simple, wildcard, or regular expressions as a type. If the website is part of a blocked category, an allow or monitor permission in the exclusion lists allows the user to access the specific URL.

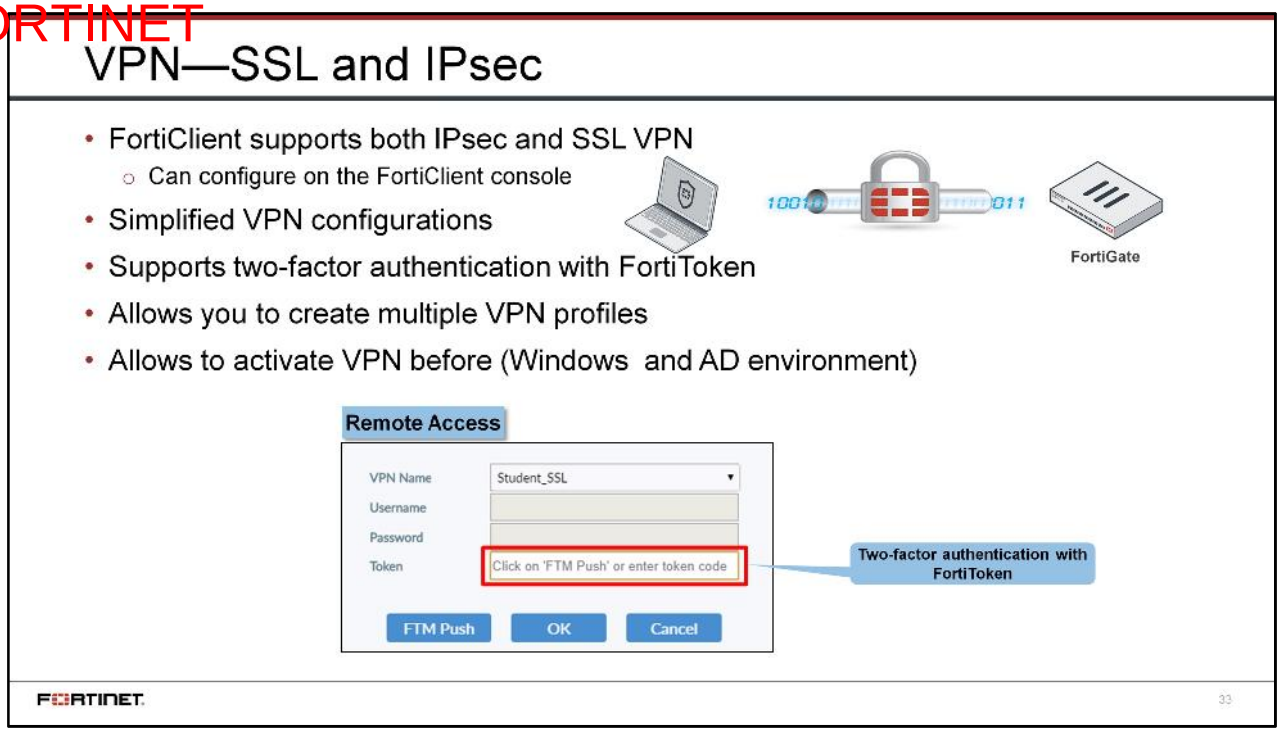


When you configure web security settings, you can enable and disable the following:

- **Site Categories**: Allows you to enable or disable FortiGuard categories.
- **Log all URLs**: Logs all URLS with an assigned action. The logged files can be downloaded.
- **Web Browser Usage and Duration**: Allows the FortiClient to record detailed information about the user's web browser activities, such as:
    - A history of websites visited by the user (as shown in regular web browser history)
    - An estimate of the duration or length of stay on the website

Note that when site categories are disabled, FortiClient is protected by the exclusion list only.

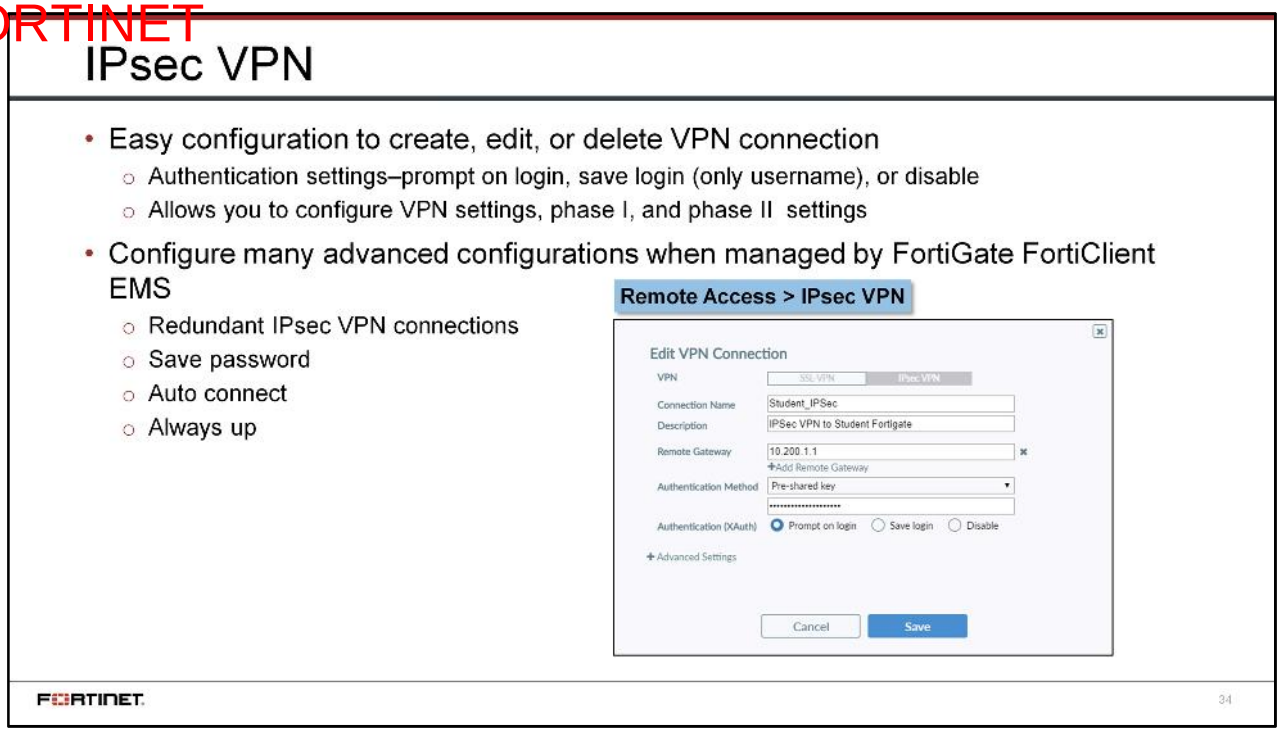
You can view site violations and violation details including the website name, category, date and time, and user name. The violation will show only if the actions is set to block or warn for FortiGuard site categories and block for the exclusion list.



FortiClient supports both IPsec and SSL VPN connections to your network for remote access. You can provision client VPN connections in the FortiClient profile (managed client) or configure new connections in the FortiClient console (standalone client).

You can also configure two-factor authentication using FortiToken for enhanced security for both types of VPNs on your FortiGate device for FortiClient VPN connections.
FortiClient VPN features are not limited to basic configuration and provisioning, but can be used for advanced configurations (managed clients). For example, you can automatically connect to a VPN when FortiClient is launched, or you can map or unmap a network drive when tunnel is connected or disconnected, respectively.

You can also configure FortiClient to connect to a VPN before the logging in (either in to a Windows account or through an AD environment).



You can configure the IPsec VPN configuration directly on the FortiClient console. It allows you to create, edit, save, or delete IPsec VPN. You can create and save multiple IPsec connections. As this configuration is one side of the IPsec VPN, this configuration settings needed to be matched with the FortiGate IPsec configuration in order to connect and access remote resources.

When FortiClient is managed by FortiGate or FortiClient EMS, it allows you provision these configurations along with advanced configurations such as redundant IPsec VPN connections, save password, auto connect, and always up, to name a few.

SSL VPN

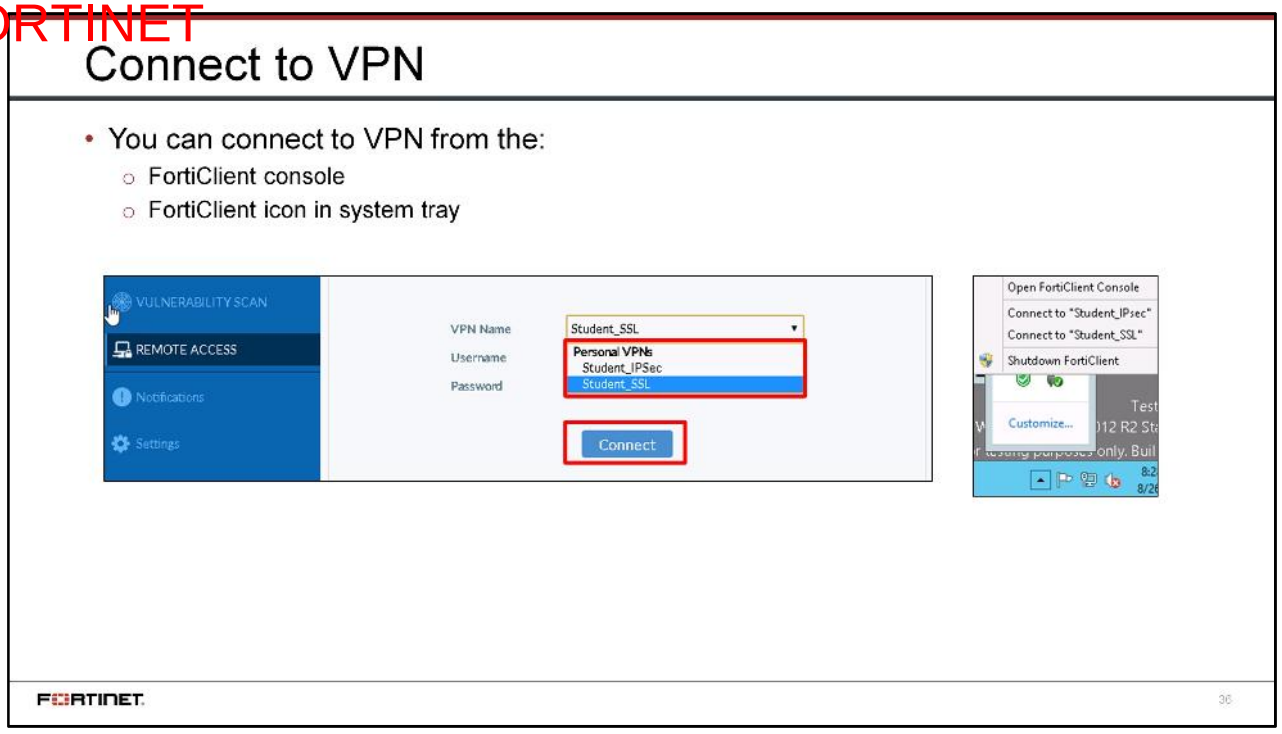
- Create, edit, or delete a VPN connection:
  - Save the login information–username
  - Configure authentication–prompt on login, save login (only username), or disable (only when Client Certificate option is enabled)
- When managed by FortiClient EMS, perform advanced configuration:
  - Priority-based SSL VPN connections
  - SSL VPN portal on FortiGate allows
    - Save password
    - Auto connect
    - Always up
- Supports DTLS
  - If required falls back to TCP over TLS
  - Windows Only

FORTINET 35

The SSL VPN configuration is similar to IPsec configuration where you configure one side of the tunnel and other side is configured on FortiGate.

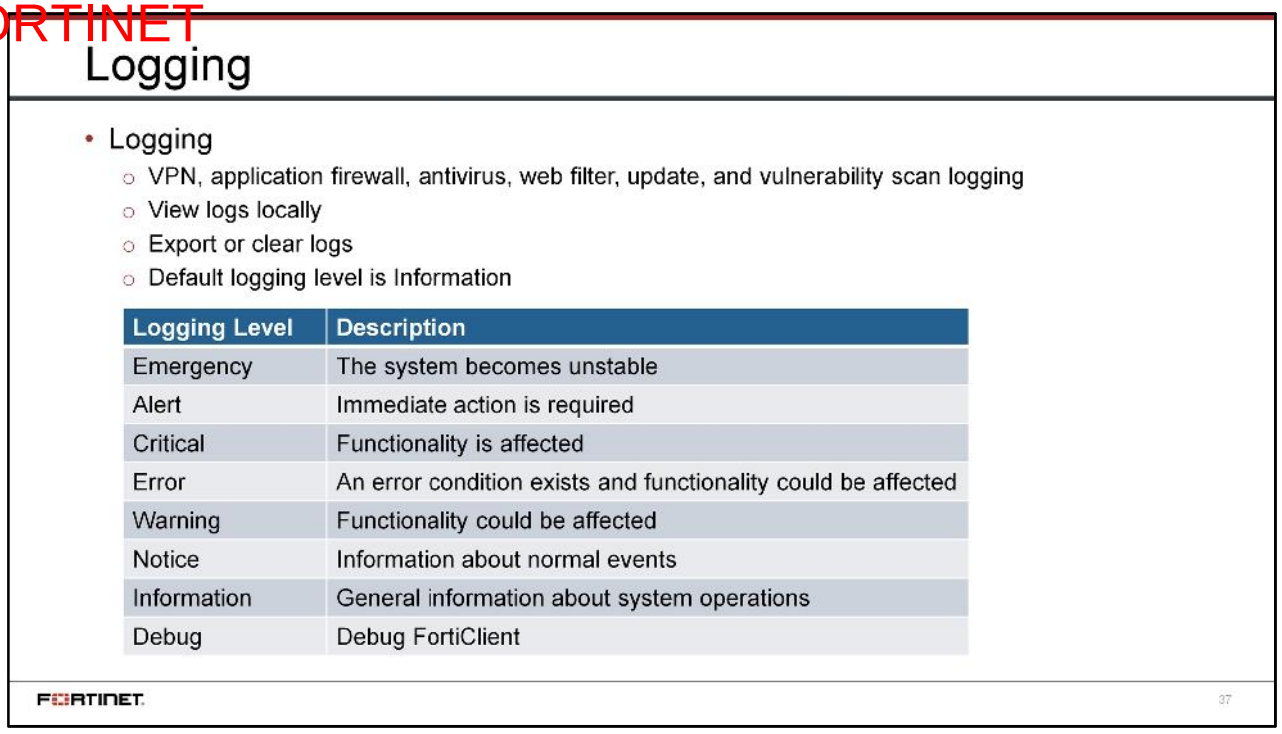
When FortiClient is managed by FortiGate or FortiClient EMS, it allows you provision these configurations along with advanced configurations on SSL VPN portals, and many more.

DTLS is a Windows only feature, and not recommended for slow or networks.



To connect to a VPN (IPsec or SSL), select the VPN name from the drop-down menu on FortiClient console. Enter your username, password, and the click **Connect**. Optionally, in the system tray, right-click the FortiClient icon and select the VPN connection you want to connect to. When connected, the console will display the connection status, duration, and other relevant information.

Note that provisioned VPN connections will be listed under **Corporate VPN**. Locally configured VPN connections will be listed under **Personal VPN**.



You can view the logs locally on FortiClient. Some features logging is only available when registered to FortiGate or FortiClient EMS. You can view VPN, antivirus, web filter, and update logs in standalone client or managed client mode.

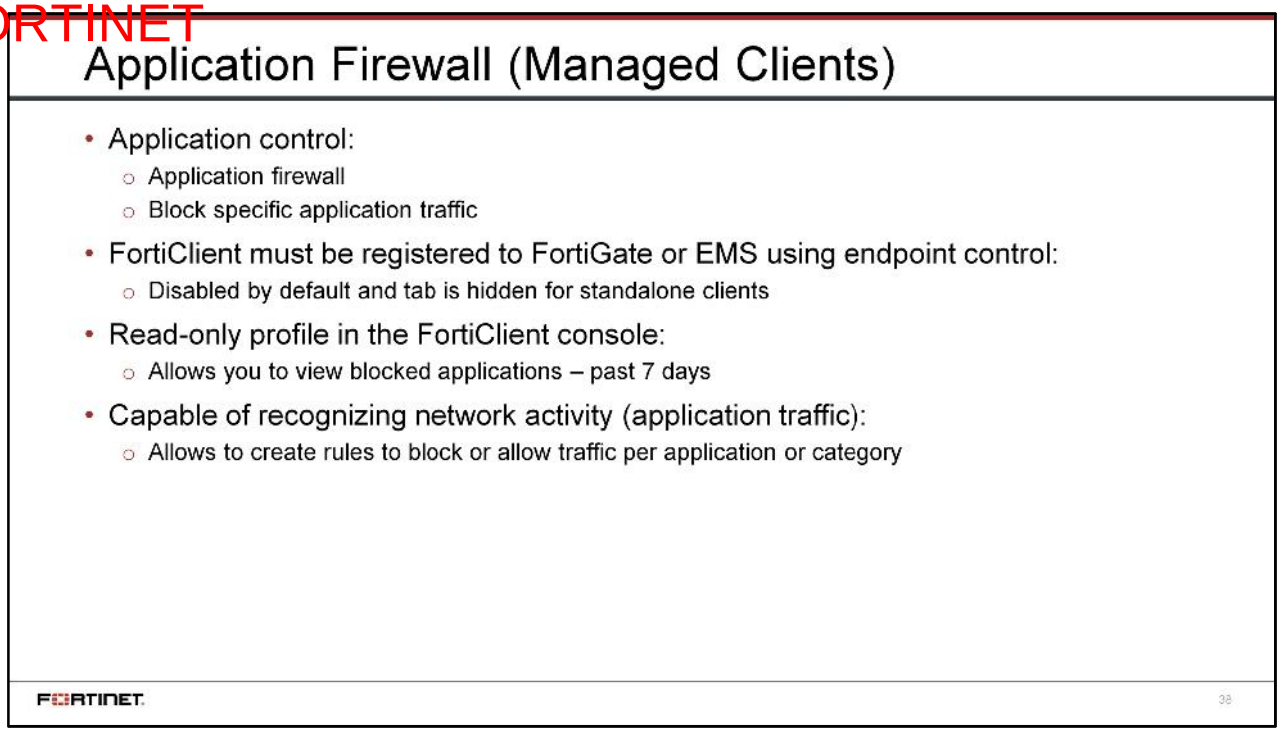
Some features, such as application firewall and vulnerability scan requires FortiClient to be managed from FortiGate or FortiClient EMS; therefore, logging is only available when FortiClient is managed by FortiGate or FortiClient EMS.

You can export the log file (.log) in standalone or managed mode, but the option to clear logs is only available only in standalone mode.

FortiClient provides options for logging levels, such as information, notice, or emergency. When FortiClient is managed by FortiGate or FortiClient EMS, you can configure the XML configuration to set the logging levels.

Default logging level on FortiClient is **Information**.

So far, you have learned about mostly the features that are available in standalone client. Now you will learn about the features that are available for managed client mode.

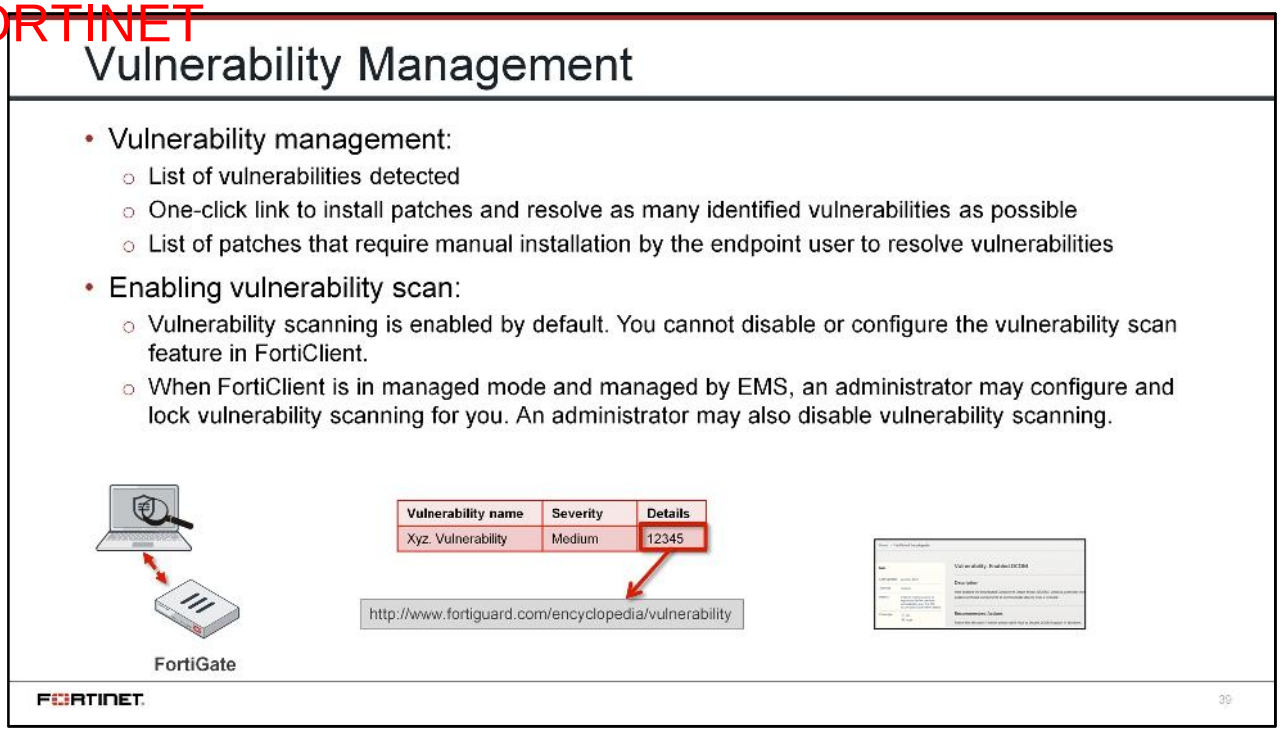


You can use the application firewall feature to detect and take actions against network traffic, depending on the application that is generating the traffic. This feature is available on managed clients only. By default, this feature is disabled and hidden for the standalone clients.

Application firewall uses IPS protocol decoders to analyze and detect application traffic even, on non-standard ports.

FortiClient can recognize the traffic generated by a large number of applications. You can create rules to block or allow application traffic on FortiGate or EMS based on the category or application. The rules are then pushed to managed FortiClient.

Application firewall settings are read-only on the FortiClient console. You view blocked applications for the past 7 days.

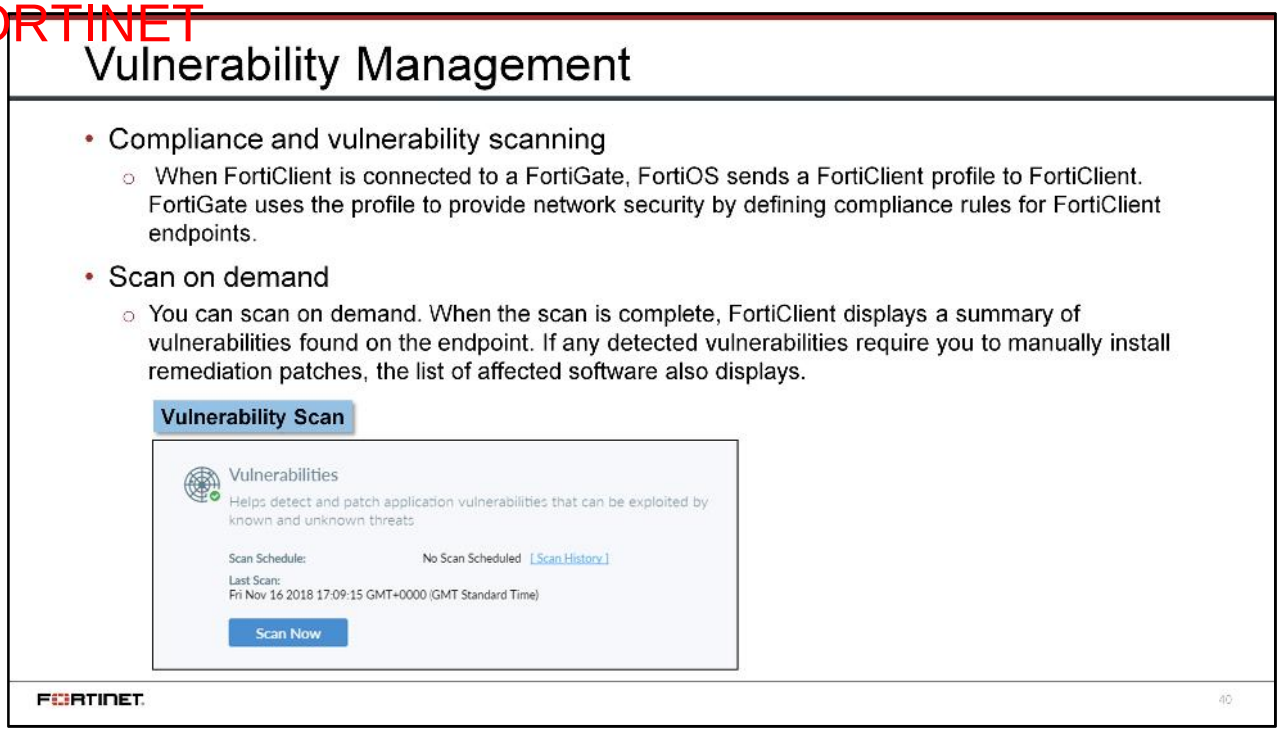


When endpoint users are transferring data over internet hackers can exploit vulnerabilities in endpoint devices, and use those vulnerabilities to gain unauthorized access to the system.

FortiClient can perform a vulnerability scan to search endpoint devices to identify weaknesses, provide details about the impact of those weaknesses and recommend actions to protect the applications running on the endpoint devices.

Vulnerability scanning is available on both managed and standalone clients. FortiClient communicates with the FortiGuard Center to get the signature updates.

After the scan is compete, FortiClient displays the list of vulnerabilities and details. You can click on an item in the list, such as release date, severity, impact, and recommended actions, to name a few.

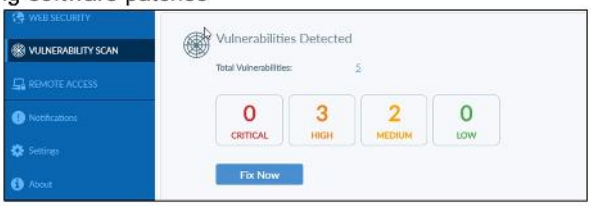


If compliance is enabled for FortiClient in managed mode, and FortiGate compliance rules require it, all automatic and manual software patches must be installed within a time frame to maintain compliant status and network access. The default time frame is one day.

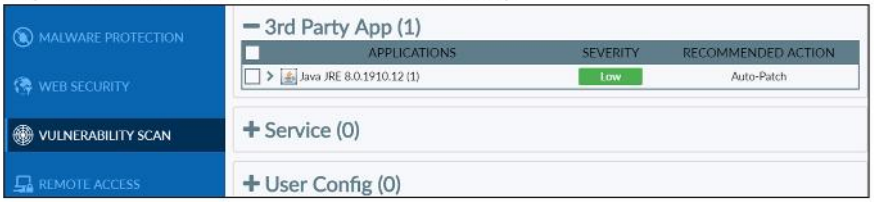
However, the FortiGate administrator may choose a different time frame. Contact your system administrator to learn how long you have to fix vulnerabilities.

Vulnerability Management

- Automatically fixing detected vulnerabilities
  - You can automatically install software patches by clicking **Fix Now** or review detected vulnerabilities before installing software patches



- Reviewing detected vulnerabilities before fixing

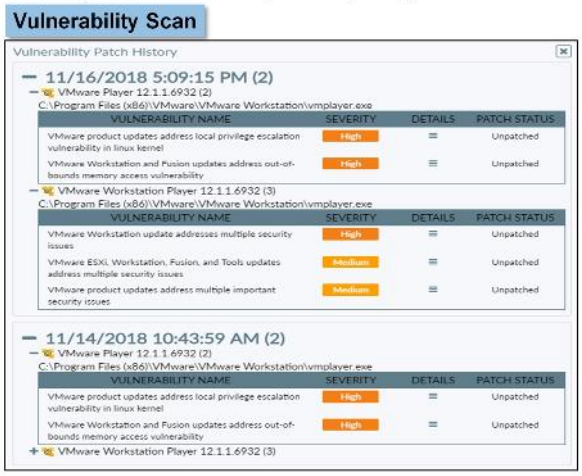


FORTINET 41

Vulnerability scan identifies vulnerabilities on the endpoint that should be fixed by installing software patches. You can automatically install software patches by clicking **Fix Now** or you can review detected vulnerabilities before installing software patches. Any software patches that cannot be automatically installed are also listed and you should manually download and install software patches for the vulnerable software.

Vulnerability Management

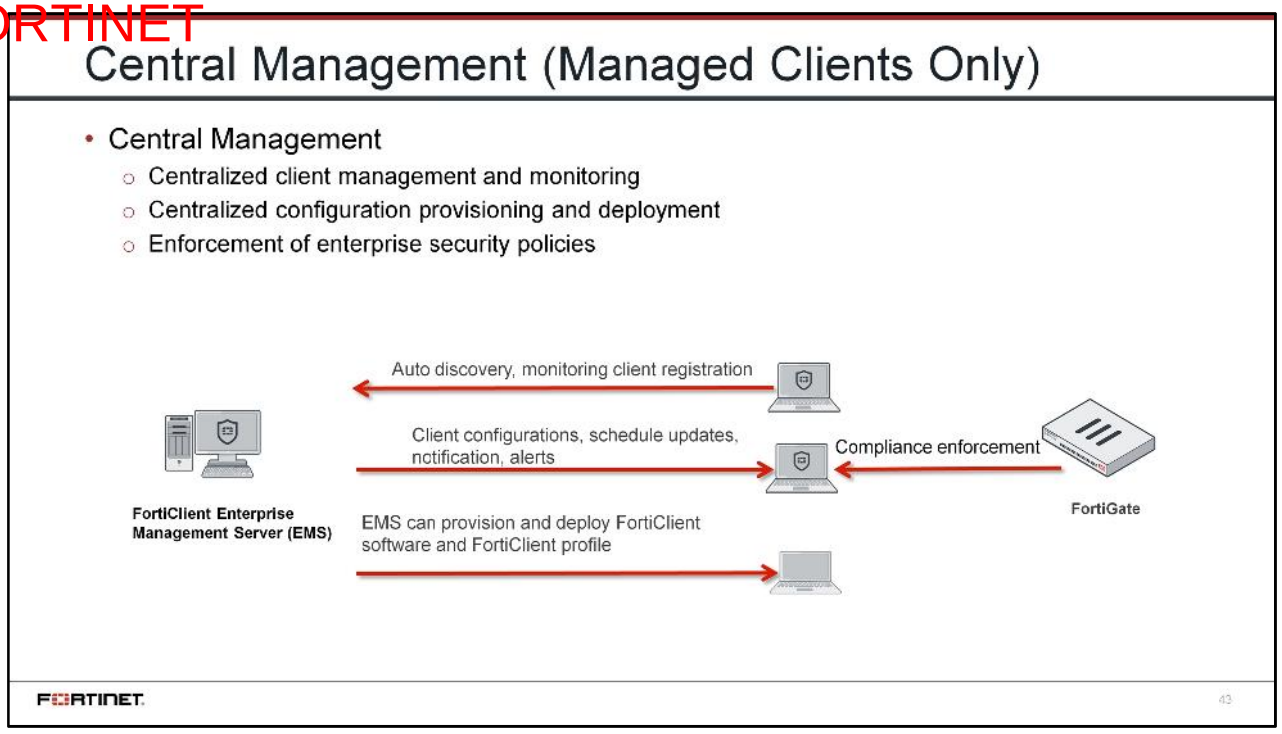
- Manually fixing detected vulnerabilities
  - In some cases, FortiClient cannot automatically install software patches, and you must manually download and install software patches
- Viewing vulnerability scan history



FORTINET 42

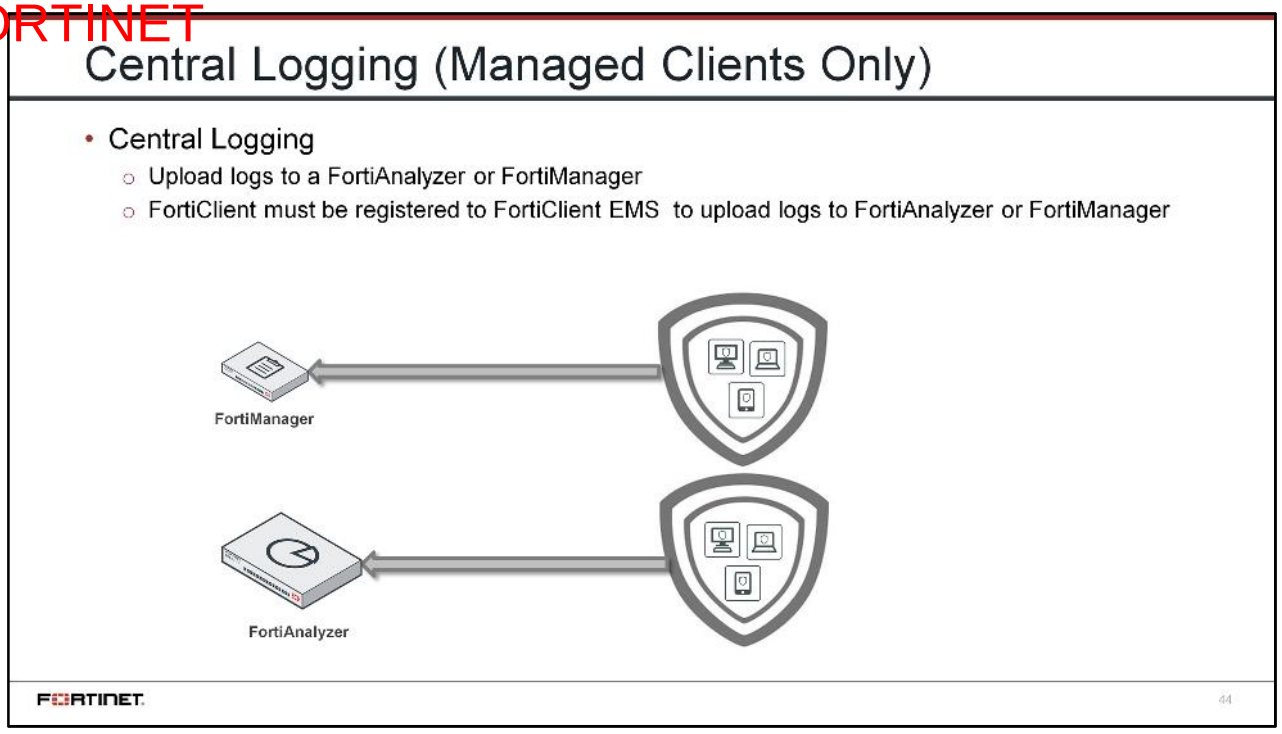
When the scan is complete, FortiClient displays a summary of vulnerabilities found on the endpoint. If any detected vulnerabilities require you to manually install remediation patches, the list of affected software also displays.

You can view the history of the last seven vulnerability scans and patches. You can view the history to see what software was identified as vulnerable and whether patches for the vulnerabilities were installed.



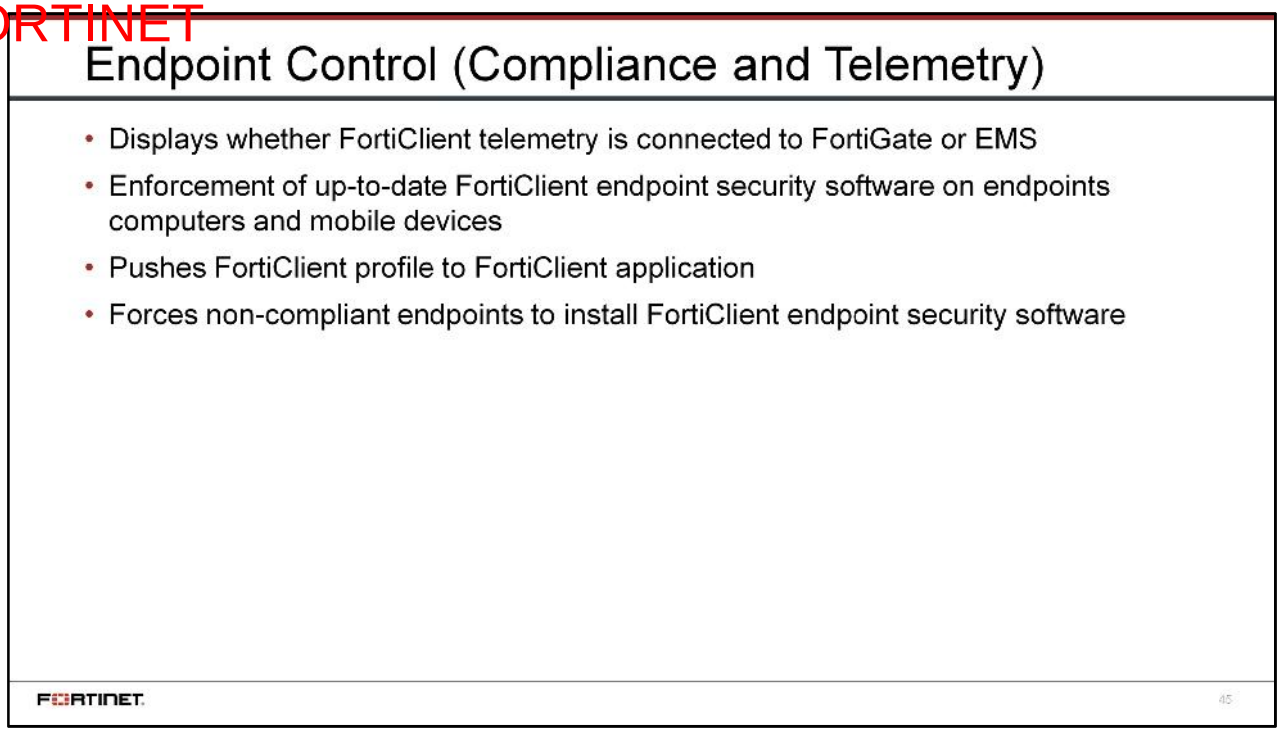
FortiClient can be fully integrated with FortiClient EMS for management and deployment. You can configure your FortiClient EMS device to discover new devices on your network, enforce FortiClient registration, and deploy FortiClient software(initial installation), and assigns FortiClient profile to connected FortiClient endpoints. The FortiClient profile can be deployed to devices on your network and over a VPN connection.

FortiGate is used for compliance enforcement. After FortiClient software is installed on endpoints, and the FortiClient endpoints connect FortiTelemetry to FortiGate, FortiClient forces the users to use the network access based on the enterprise compliance security policies configured on FortiGate. **FortiClient Compliance** security profile configured on FortiGate is used to communicate compliance rules to FortiClient endpoints.



The standalone FortiClient collects and save the logs locally, but what if logs are needed for reporting, auditing, or retention purposes?

You can register FortiClient to FortiGate or FortiClient EMS, which allows you to upload the logs to a central repository, such as FortiManager or FortiAnalyzer. From here, you can run the report or keep the logs for retention purposes.



Endpoint protection enforces the use of up-to-date FortiClient endpoint security software on endpoints (workstation computers and mobile devices). FortiClient enforcement can check that the endpoint is running the most recent version of the FortiClient application, that the antivirus signatures are up-to-date, and that the firewall is enabled.

When FortiClient telemetry is connected to EMS, compliance is not enforced.

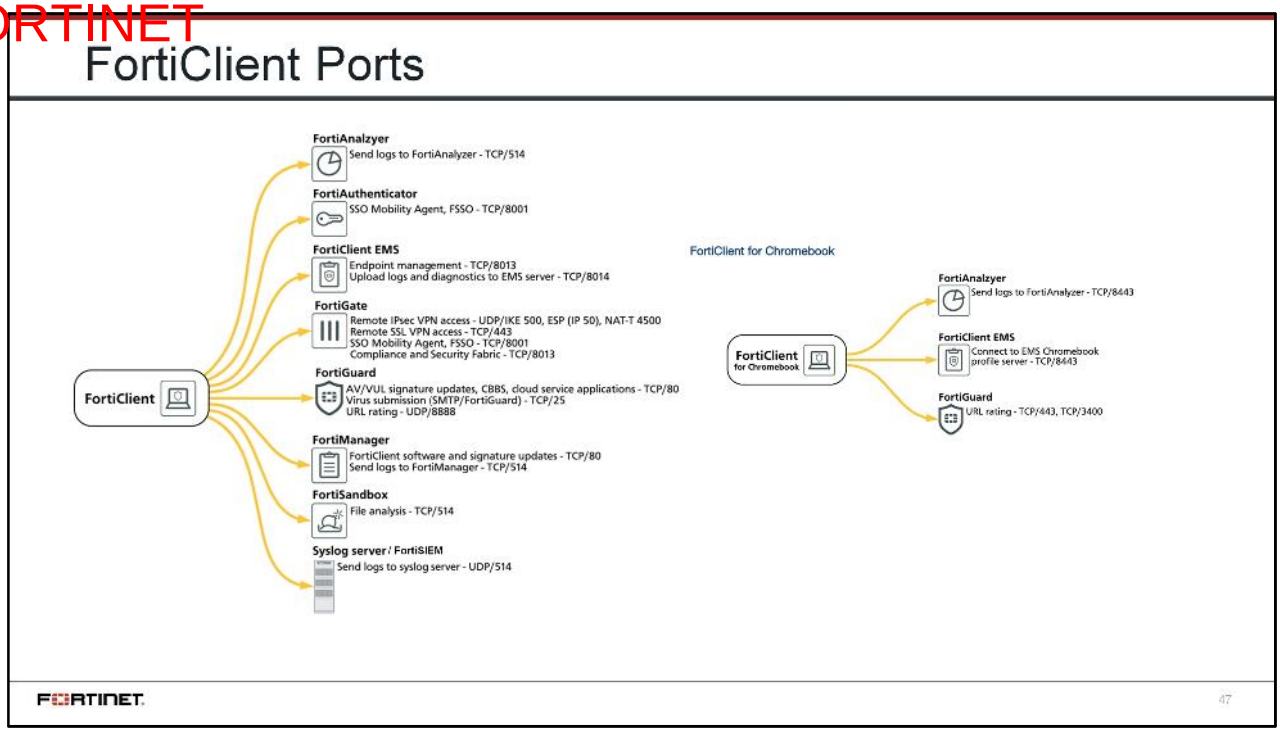
Note that you will learn more about compliance and telemetry in another lesson. This feature requires FortiOS 5.4.1 or later, or FortiClient EMS 1.0 or later.

Feature Support

	WINDOWS	MAC OS X	ANDROID	iOS	ChromeBook	Linux
SECURITY FABRIC COMPONENTS						
Endpoint Telemetry[1]	✓	✓	✓	✓	✓	✓
Compliance Enforcement[1]	✓	✓	✓	✓		✓
Endpoint Audit and Remediation with Vulnerability Scanning[1]	✓	✓				✓
Automated Endpoint Quarantine	✓	✓				
HOST SECURITY AND VPN COMPONENTS						
Antivirus	✓	✓				✓
Anti-Exploit	✓					
Sandbox Detection	✓					✓*
Web Filtering[2]	✓	✓	✓	✓	✓	
Application Firewall[1]	✓	✓				
IPSec VPN	✓	✓	✓	✓		
SSL VPN[3]	✓	✓	✓	✓		✓
OTHERS						
Remote Logging and Reporting[4]	✓	✓		✓	✓	
Windows AD SSO Agent	✓	✓				
USB Device Control	✓	✓				✓

FORTINET

Standalone clients support a number of features, such as VPNs, antivirus, web filtering and more. However, when a standalone client is registered with FortiGate or FortiClient EMS, it enhances comprehensive security, helping you to safeguard your systems with advanced security technologies, which are all managed from a single management console with easy provisioning, monitoring, and auditing.
You can also customize the FortiClient installation and use VPN auto-connect to ensure that FortiClient creates a VPN connection to the FortiGate when it is considered to be off-net. FortiClient also supports configuration provisioning for iOS (iOS. mobileconfig) in addition to FortiClient configuration provisioning.



You use FortiClient ports to communicate with other Fortinet products.

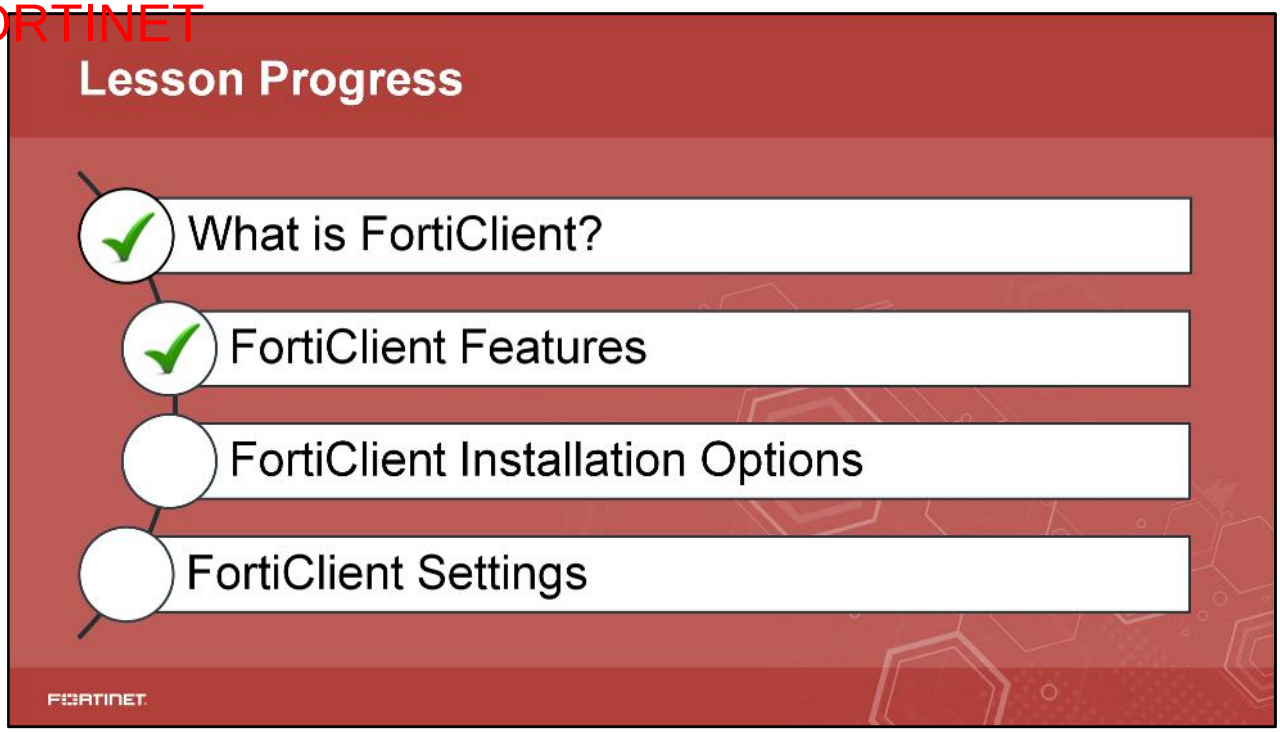
Note that Chromebook Port TCP 3400 for URL rating is only used with EMS.

Knowledge Check

1. Which of the following features are included in FortiClient malware protection?
   - A. Antivirus, vulnerability scan, and sandbox integration
   - ✓ B. Antivirus, antiexpliot, and sandbox integration

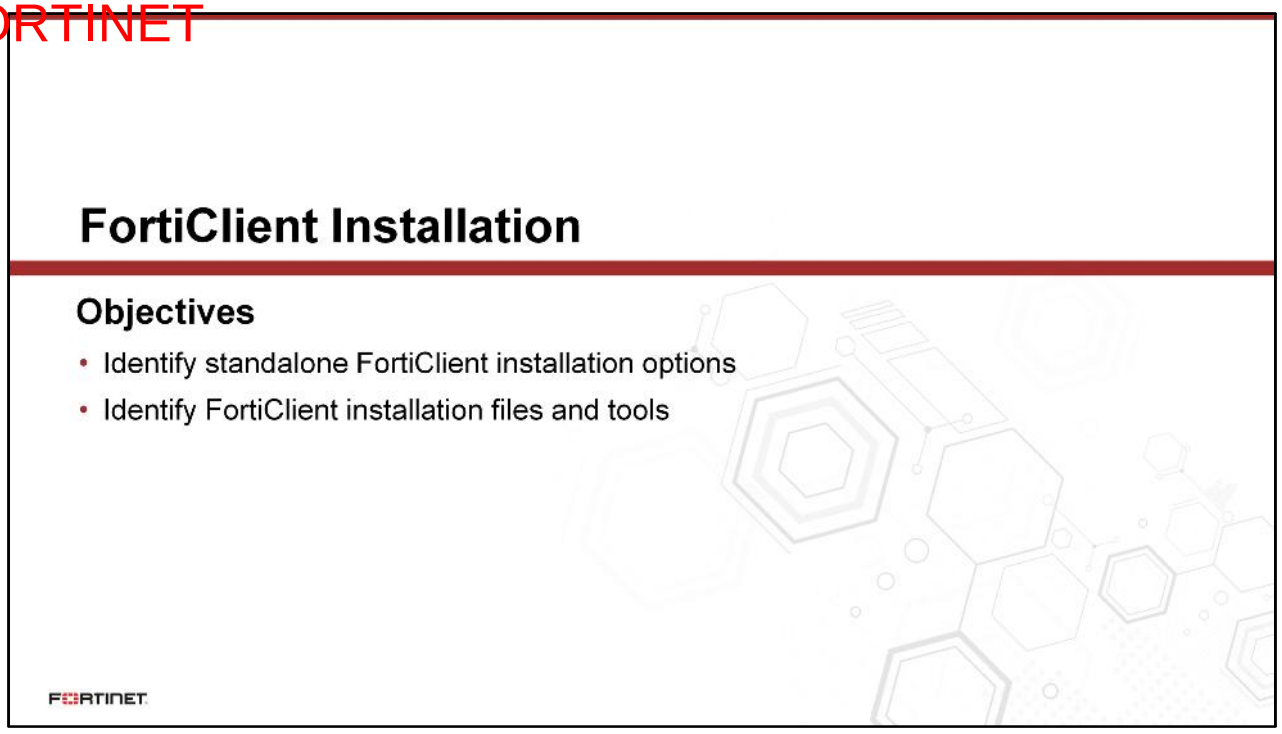
2. Which VPN types are supported in FortiClient?
   - A. IPSec and PPTP
   - ✓ B. IPSec and SSL

FORTINET 48



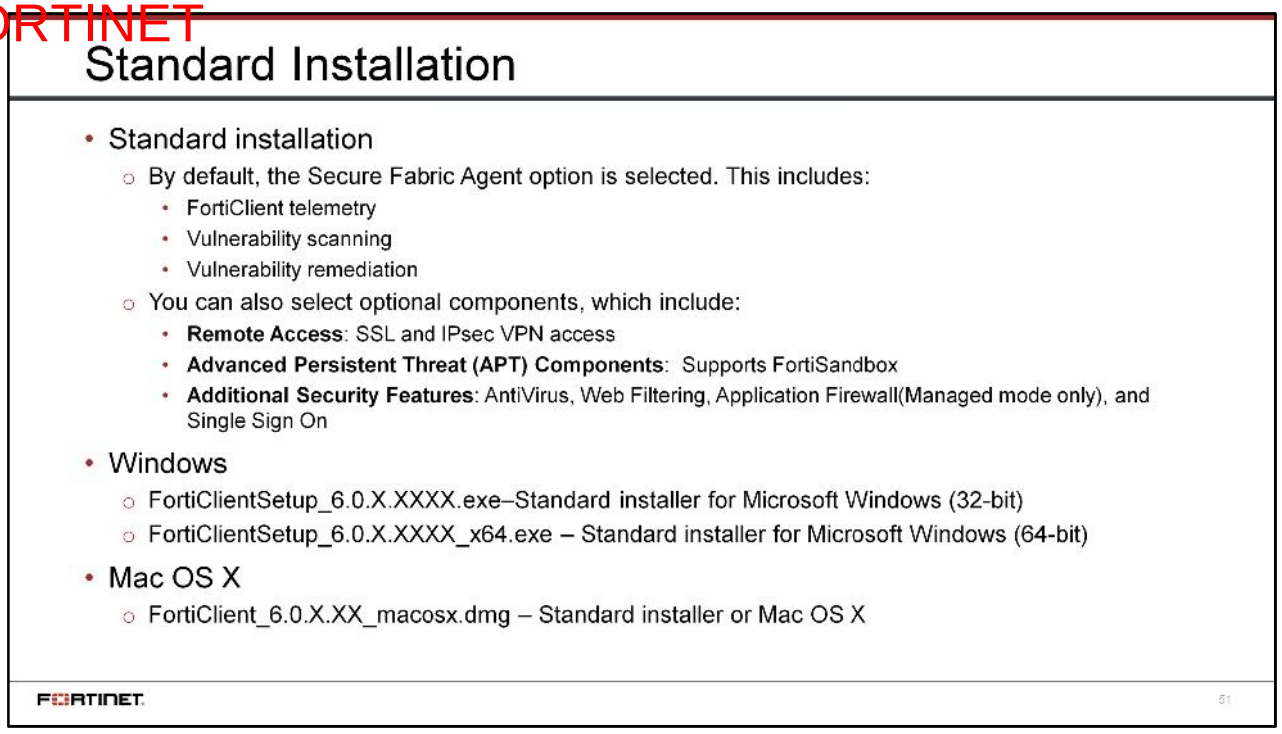
Good job! You now know FortiClient features

Now, you will learn about FortiClient installation options.



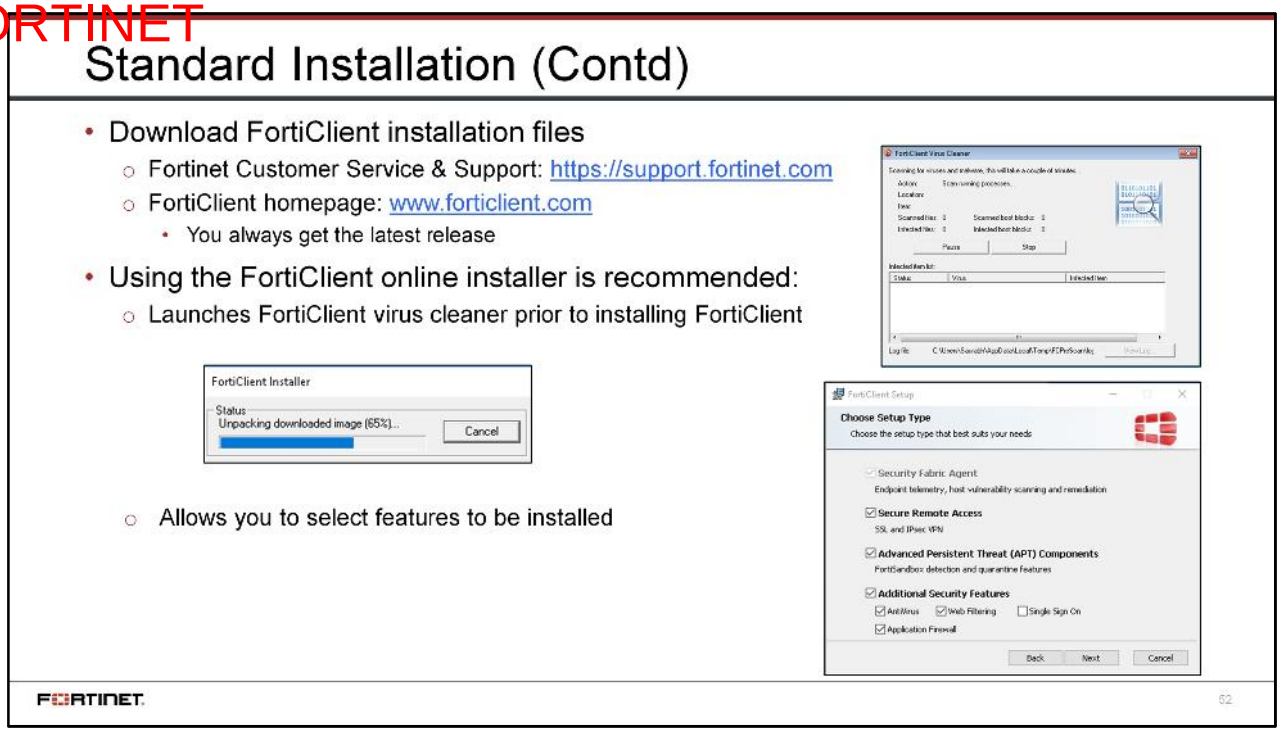
After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in identifying and understanding FortiClient installation options, tools, and features, you will be able to select the appropriate options and tools to install FortiClient in your network.



You can install the FortiClient as standard installation and choose the setup type that best suits your needs. For example, if you would like to install only the VPN component, you can select the **Secure Remote Access** option. If you select all options, all endpoint security and VPN components are installed.

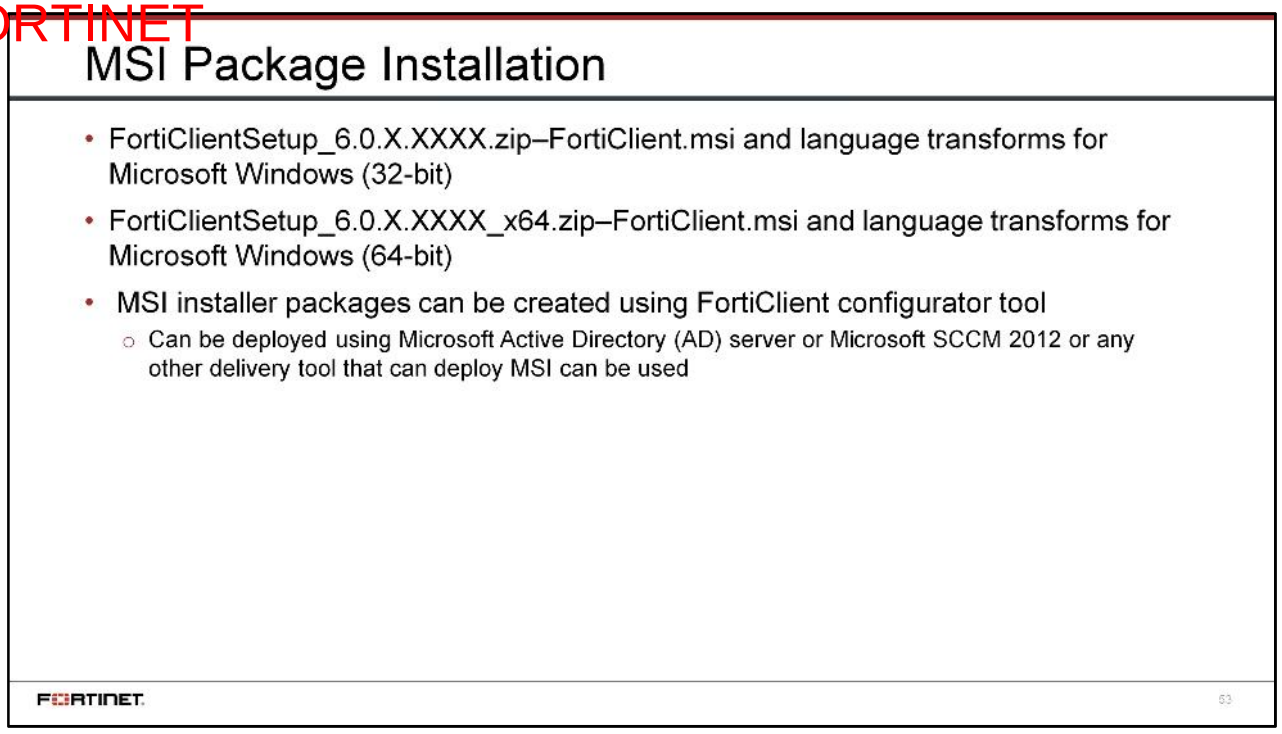
What if you want to install specific features, such as antivirus and web filtering, or you want to do VPN automation?
There are various tools and MSI package installations that you can use to configure and install a custom FortiClient installation. You will learn more about custom FortiClient installation in this lesson.



You can download the FortiClient installation file from the Fortinet support site or the FortiClient home page. The FortiClient home page will always have latest release of FortiClient. If you need an older version of FortiClient, use Fortinet service and support website.

When you install FortiClient, you can select which setup type and options to install:

- **Security Fabric Agent:** Selected by default. This option installs components to support the security fabric available with FortiGate, including FortiClient telemetry, vulnerability scanning, and vulnerability remediation.
- **Secure Remote Access:** Optional. This option supports SSL and IPsec VPN access.
- **Advanced Persistent Threat (APT) Components:** Optional. Supports FortiSandbox.
- **Additional Security Features:** Optional. This option supports antivirus, web filtering, application firewall, and single sign-on. You can select one, several, or all security options.

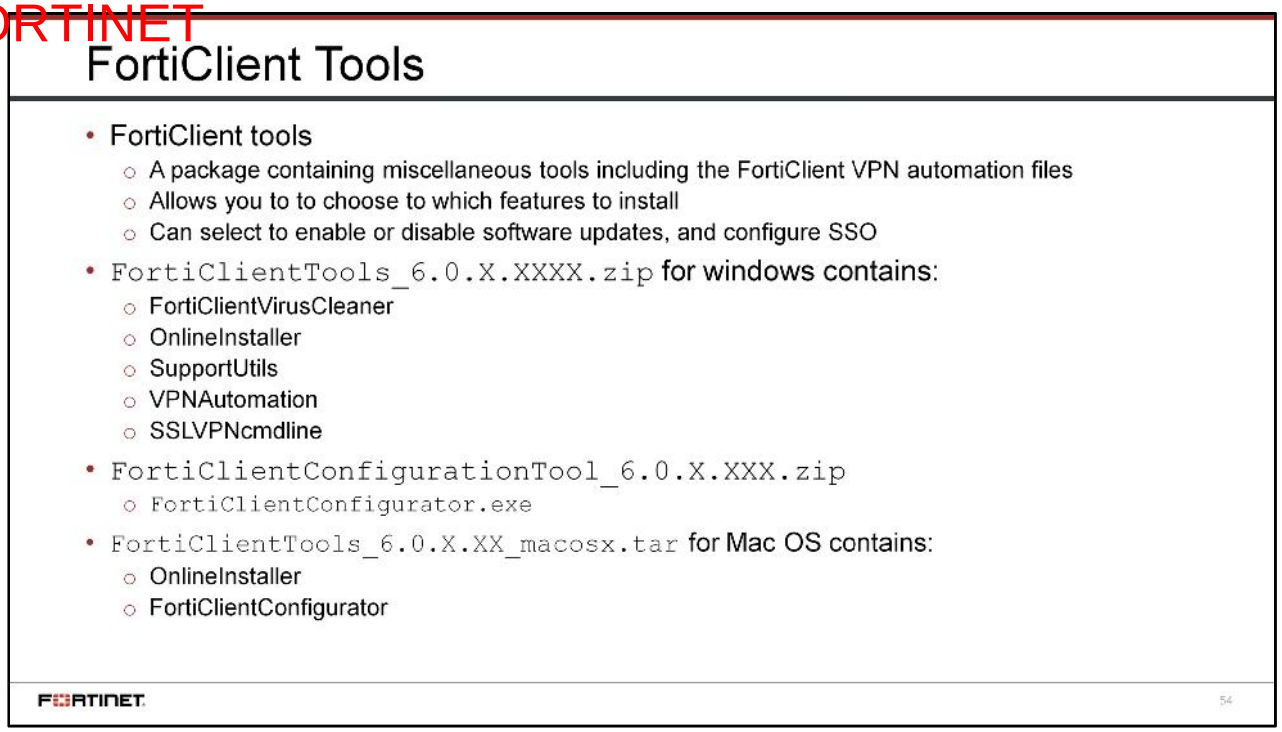


MSI installers are supported in Microsoft Windows environments only.

`FortiClientSetup_6.0.X.XXXX.zip`: A zip package containing FortiClient.msi and language transforms for 32-bit Windows. Some properties of the MSI package can be customized with FortiClientConfigurator.exe, which can found in `FortiClientTools_6.0.X.XXXX.zip`.

`FortiClientSetup_6.0.X.XXXX_x64.zip`: A zip package containing FortiClient.msi and language transforms for 64-bit Windows. Some properties of the MSI package can be customized with FortiClientConfigurator.exe, which can found in `FortiClientTools_6.0.X.XXXX_x64.zip`.

The MSI installer in the .zip file package is customizable for a larger roll out to many computers in an organization.



The FortiClient tools package contains various tools you can use to customize your FortiClient installation. These tools include:

- **FortiClientVirusCleaner**: This tool was developed to identify and cleanse systems of viruses.
- **OnlineInstaller**: `FortiClientInstaller.exe` downloads and installs the latest FortiClient from public FDS.
- **SupportUtils**: Contains various miscellaneous tools:
  - **RemoveFCTID.exe**: A tool to remove the unique identifier
  - **FCRemove.exe**: A clean up tool for use only if the **Add/Remove Programs** applet fails to remove FortiClient
  - **ReinstallNIC.exe**: A tool for use on Windows7 if DHCP address allocation is slow
  - **FortiClient_Diagnostic_Tool.exe**: A tool to gather information, such as FortiClient connection to FortiGuard Distribution Server (FDS), general system information, and installed features information, all of which can be useful for troubleshooting
- **VPNAutomation**: `FCCOMIntDLL.tlb` is a typeog library needed for building applications that use FortiClient's IPsec VPN COM interface.
- **SSLVPNcmdline**: `FortiSSLVPNClient.exe` is a command line tool for controlling SSL-VPN tunnels.

FortiClientConfigurationTool:

- **FortiClientConfigurationTool.exe:** FortiClient MSI files can be configured.

Mac OS X FortiClient tools file contains the following:

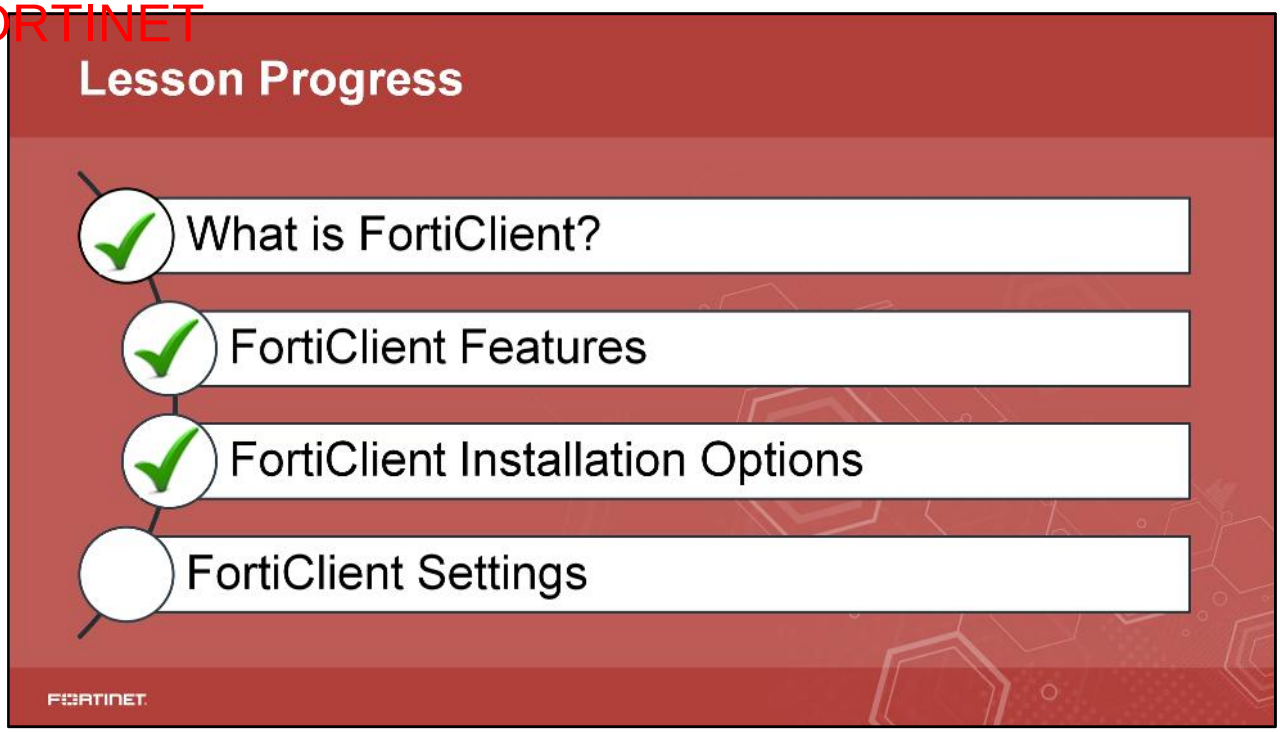
- **OnlineInstaller**: Downloads and installs the latest FortiClient file from the public FDS
- **FortiClientConfigurator**: An installer repackaging tool that can be used to create custom installation packages.

Note that starting with version 5.6, FortiClient Configurator is available without a license on the Fortinet Developer Network (https://fndn.fortinet.net).

Knowledge Check

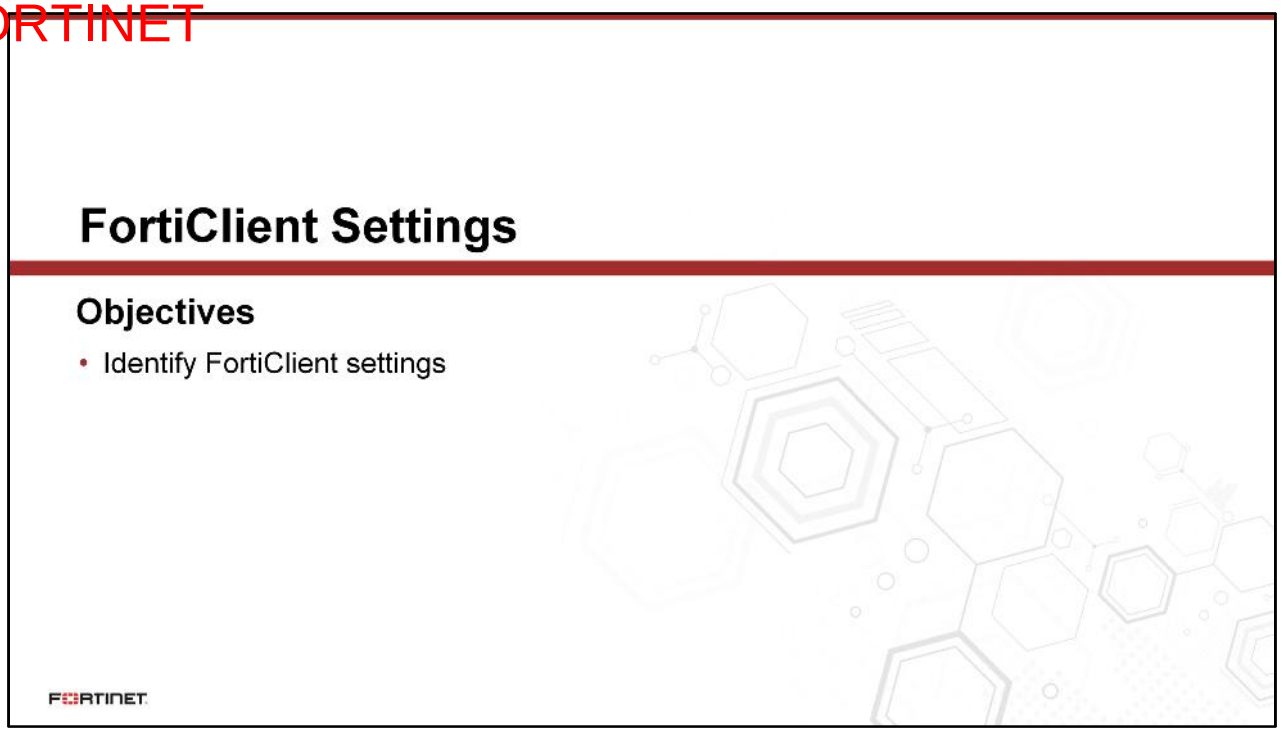
1. Which FortiClient component is selected by default and cannot be removed?
   - A. Advanced persistent threat
   - ✓ B. Security fabric agent

2. Which installation package can you use to install a custom FortiClient?
   - ✓ A. MSI package
   - B. Online installer



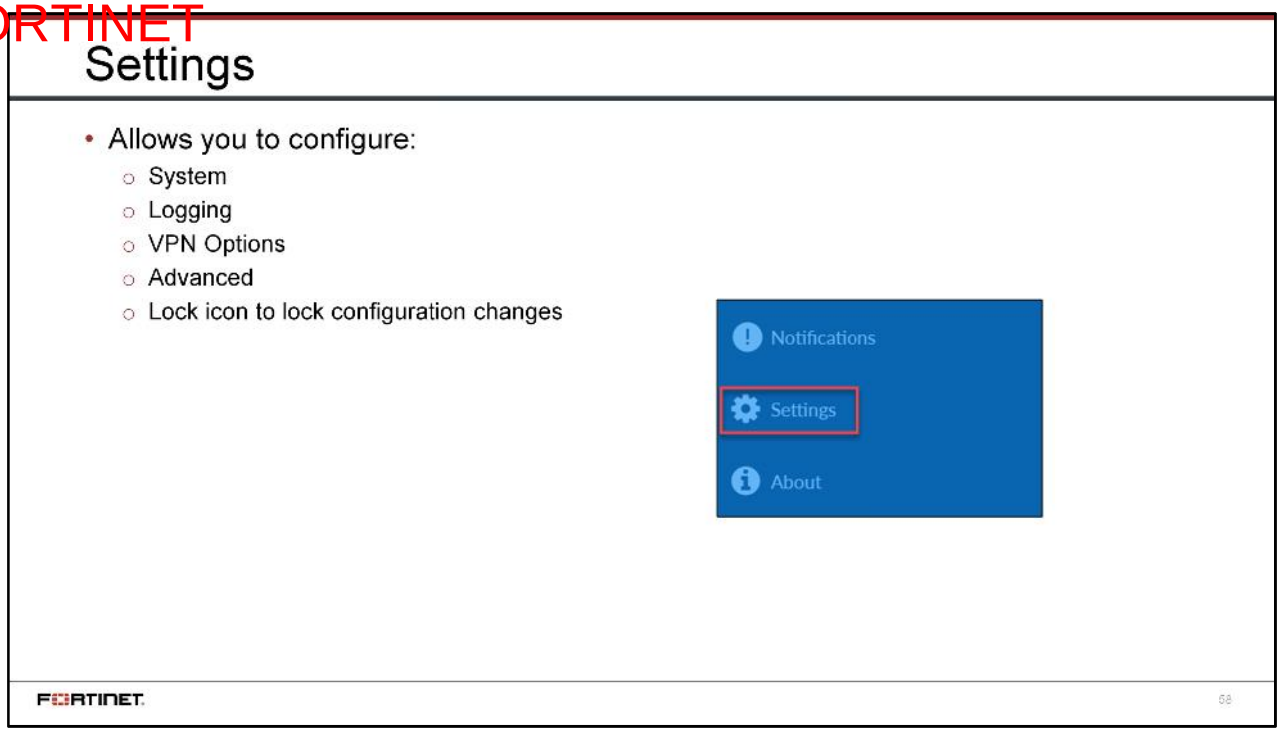
Good job! You now know FortiClient Standalone installation

Now, you will learn about FortiClient general settings.



After completing this section, you should be able to achieve the objective shown on this slide.

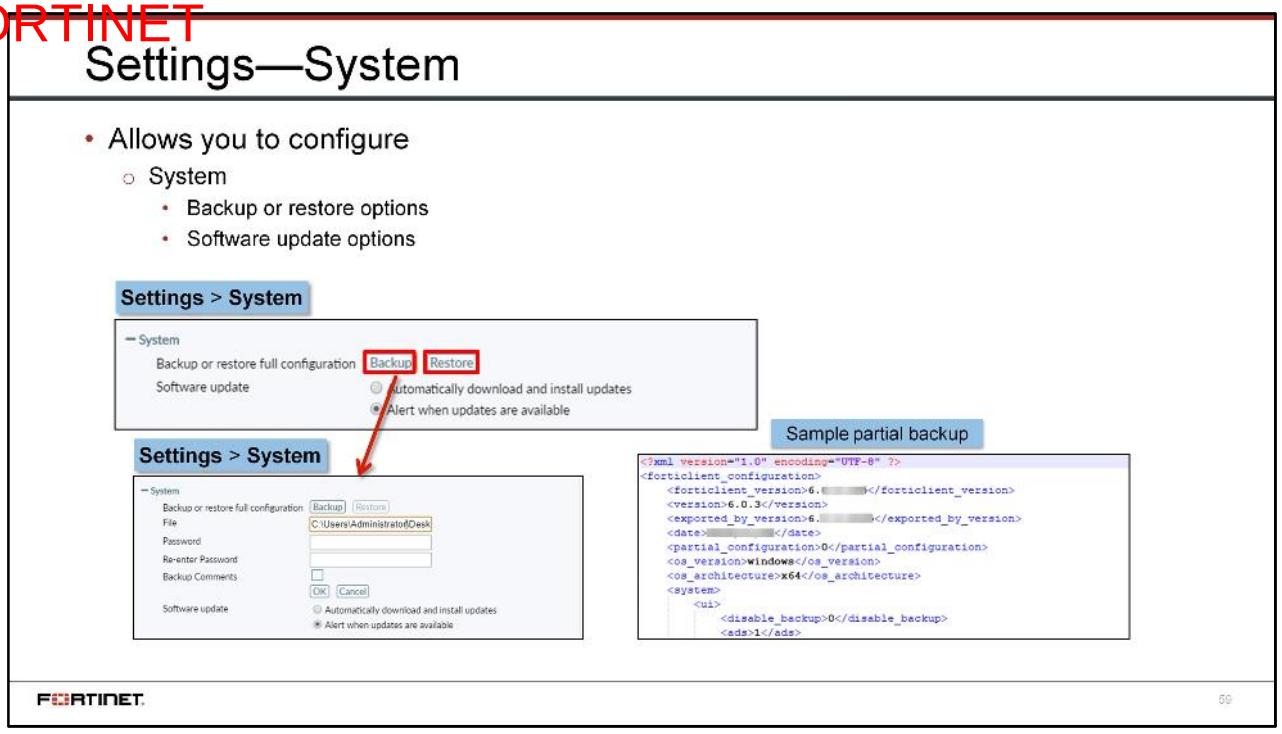
By demonstrating competence in understanding FortiClient settings, you will be able to use them effectively when setting up FortiClient.



The additional settings that are available on the FortiClient when you click **Settings**, allow you to configure:

- System
- Logging
- VPN options
- Advanced
- Lock icon to lock configuration changes

You will be exploring and configuring these options in detail in this lesson.



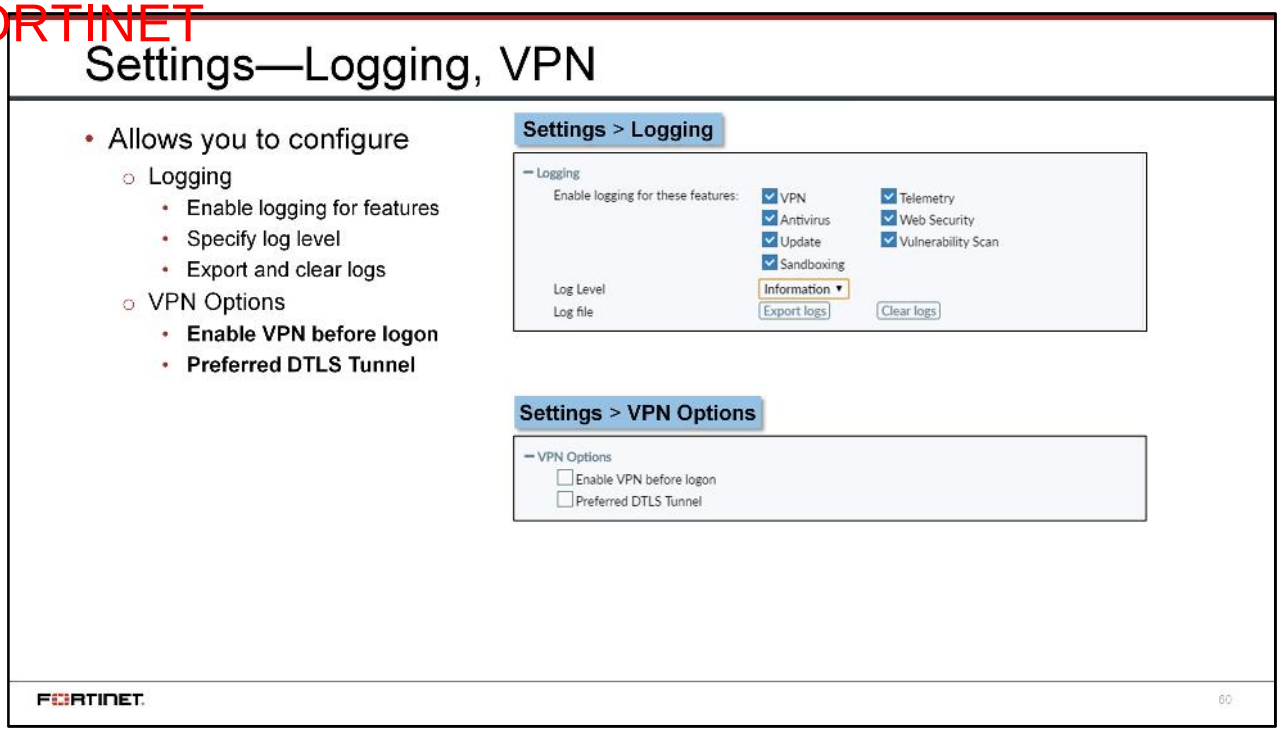
There are additional settings available on the FortiClient *Settings*, which includes:

The **System** menu allows you to:

- **Backup**: You can backup FortiClient configuration in standalone mode or when registered to FortiGate or EMS.
- **Restore**: You can restore FortiClient configuration **only** in standalone mode.

Note that the FortiClient configuration file is XML format configuration file. When performing a backup, you can select the file destination and save the file in an unencrypted (.conf) or encrypted format (.sconf). You include or exclude comments in the XML configuration file.

- **Software Updates**: You can configure the behavior of FortiClient when a new software version is available on the FDS and can be configured only when in standalone mode, in the managed mode this setting is pushed by EMS.

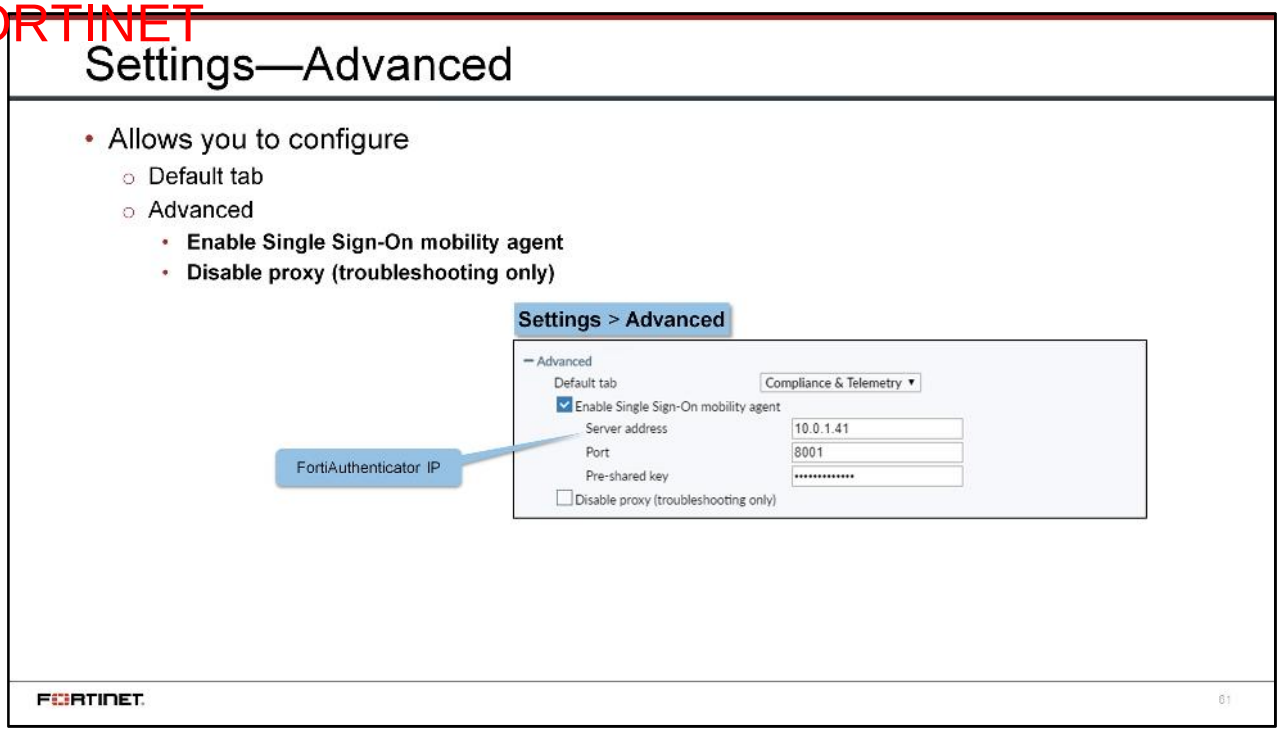


The **Logging** menu allows you to enable and disable logging for features (VPN, antivirus, web security, and update), specify log level, export logs, and clear logs. By default, logging for VPN, antivirus, web Security, telemetry, vulnerability scan, sandboxing and update is enabled. The default log level is **Information**.

Did you notice there is no option for logging for application firewall? Why?
This is because these features are available only to registered clients, and because logging can be enabled from only a management console, such as FortiClientEMS.

The **VPN Options** dropdown menu makes the **Enable VPN before logon** option available. This requires that the Windows log on screen is not bypassed. On the Microsoft Windows side, you also need to enable the User must enter a user name and password on this computer option in the User Accounts settings.
You can prefer DTLS over TLS by selecting **Preferred DTLS Tunnel**.

Note that DTLS over TLS setting is only available for Windows endpoint.



The **Advanced** menu allows you to enable:

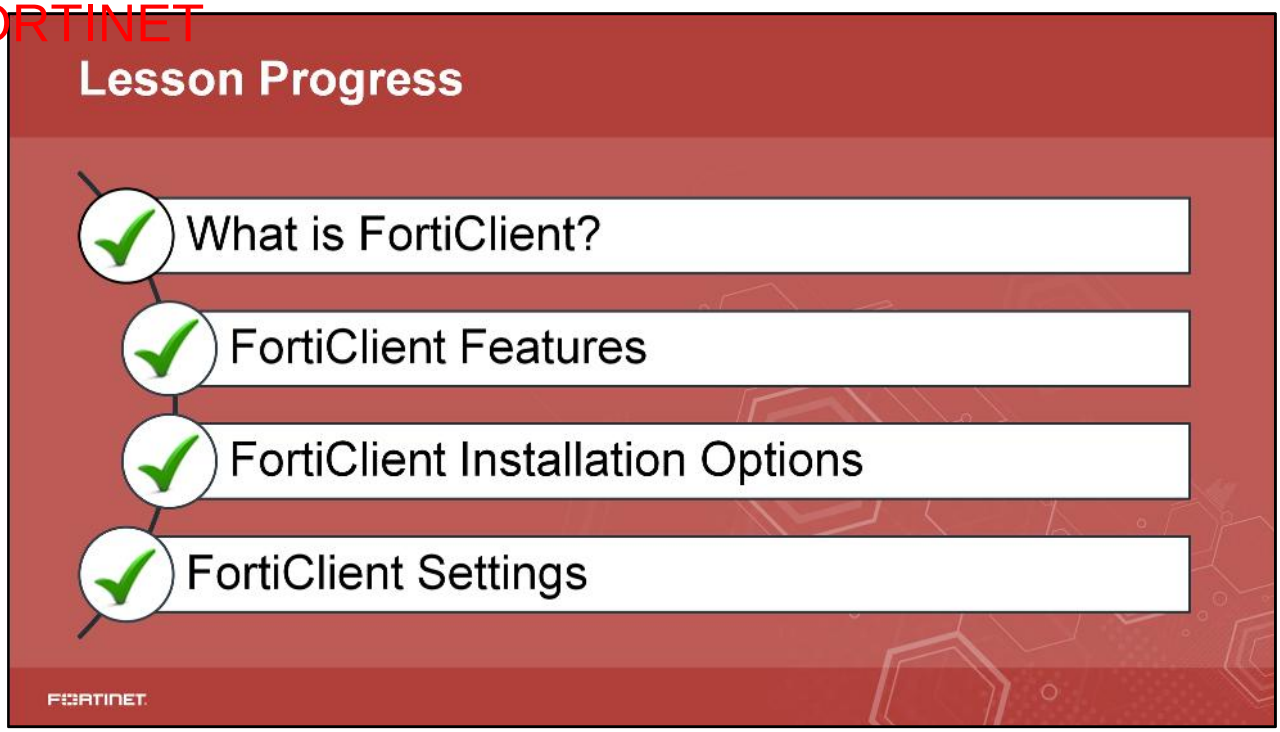
- **Default tab:** You can select the default tab to display on FortiClient while on the launch console.
- **Single Sign-On mobility agent**: It allows you to configure single sign-on (SSO) mobility agent for FortiAuthenticator. You must apply a FortiClient SSO mobility agent license to your FortiAuthenticator device. The default port is set to 8001. The FortiAuthenticator listens on a configurable TCP port. FortiClient connects to FortiAuthenticator using TLS/SSL with two-way certificate authentication. The FortiClient sends a logon packet to FortiAuthenticator, which replies with an acknowledgement packet. FortiClient to FortiAuthenticator communication requires the following:
    - The IP address should be unique in the entire network.
    - The FortiAuthenticator should be accessible from clients in all locations.
    - The FortiAuthenticator should be accessible by all FortiGates.

Note that FortiClient SSO mobility agent requires a FortiAuthenticator running v2.0.0 or later, or v3.0.0 or later.

Knowledge Check

1. Which of the following is the default log level configured on FortiClient?
   A. Critical
   ✓ B. Information

2. Which of the following components does FortiClient single sign-on mobility require?
   ✓ A. FortiAuthenticator
   B. FortiClientEMS

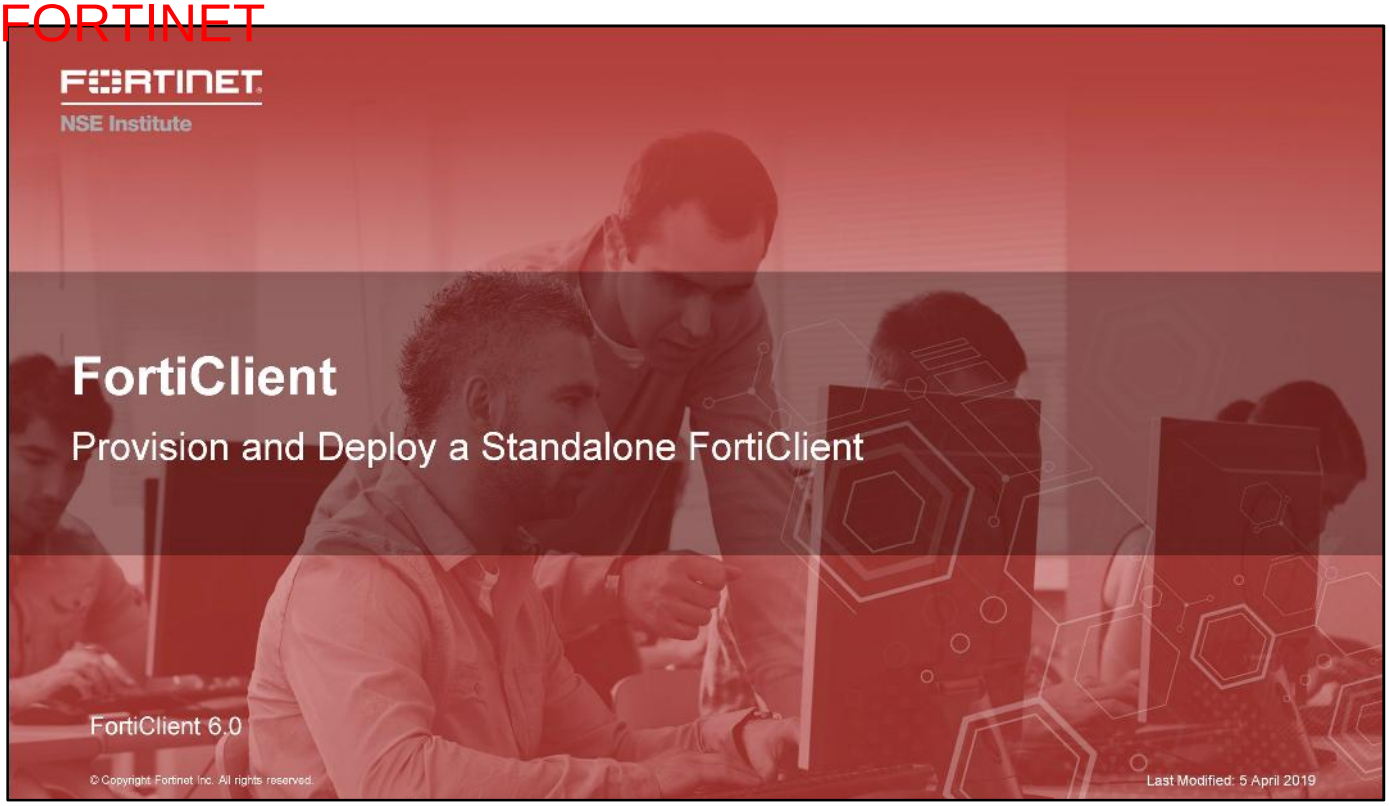


Congratulations! You have completed this lesson.

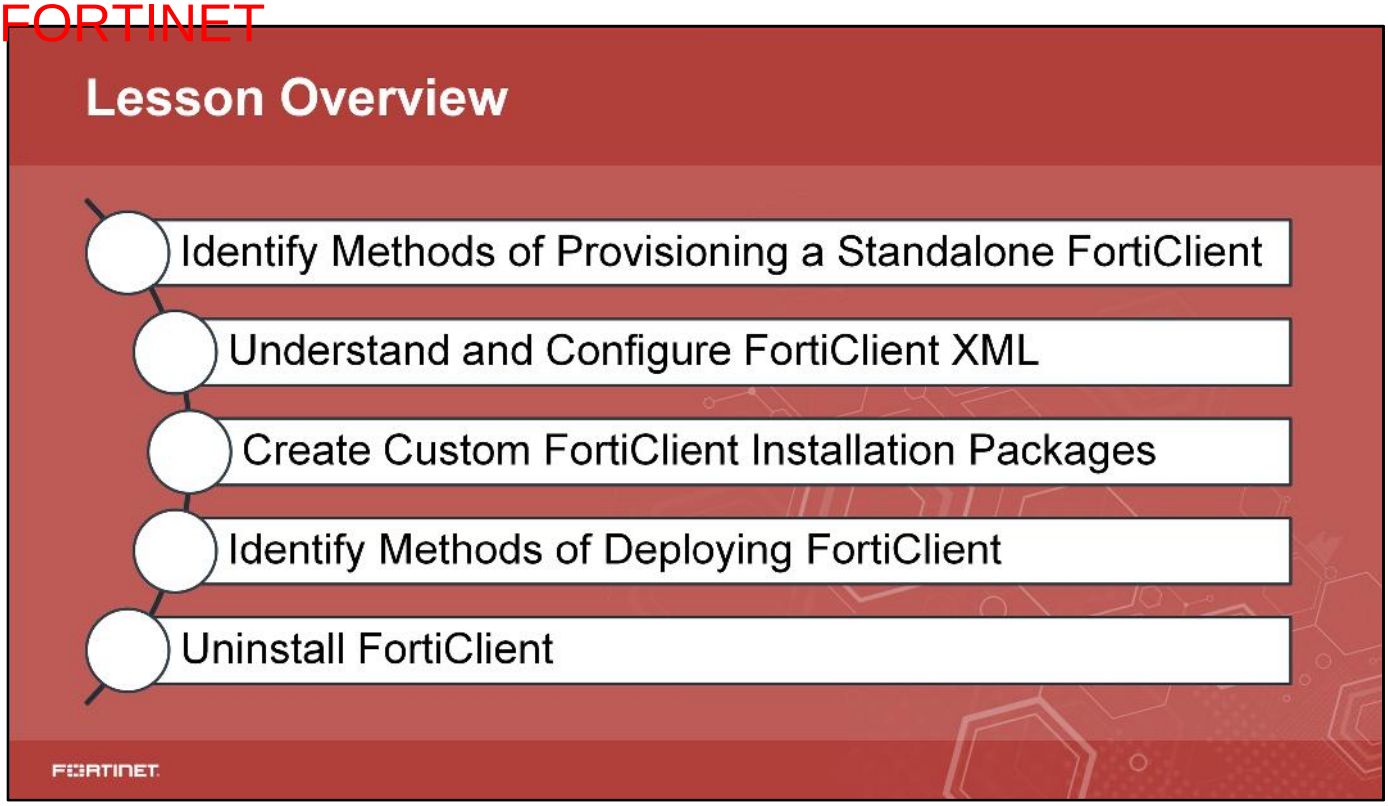
Now, you will review the objectives that you covered in the lesson.

This slide shows the objectives covered in this lesson.

By mastering the objectives covered in this lesson, you learned how to use FortiClient features and options to install and use FortiClient to secure endpoints in your network.



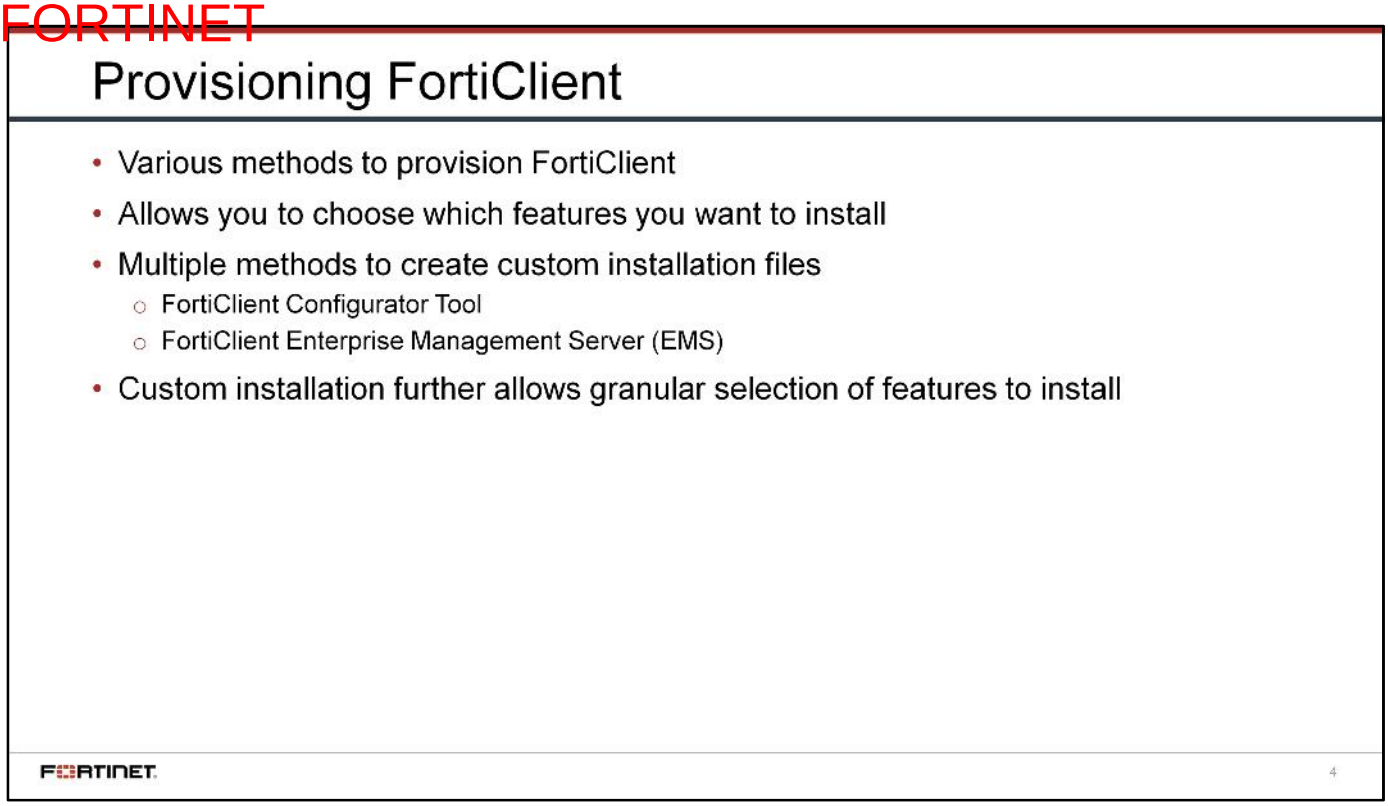
In this lesson, you will learn how to provision and deploy a standalone FortiClient in your existing network, to manage the security of multiple endpoints.



In this lesson, you will learn about the topics shown on this slide.

After completing this section, you should be able to achieve the objective shown on this slide.

By demonstrating competence in provisioning a standalone FortiClient, you will be able to provision FortiClient in your network.

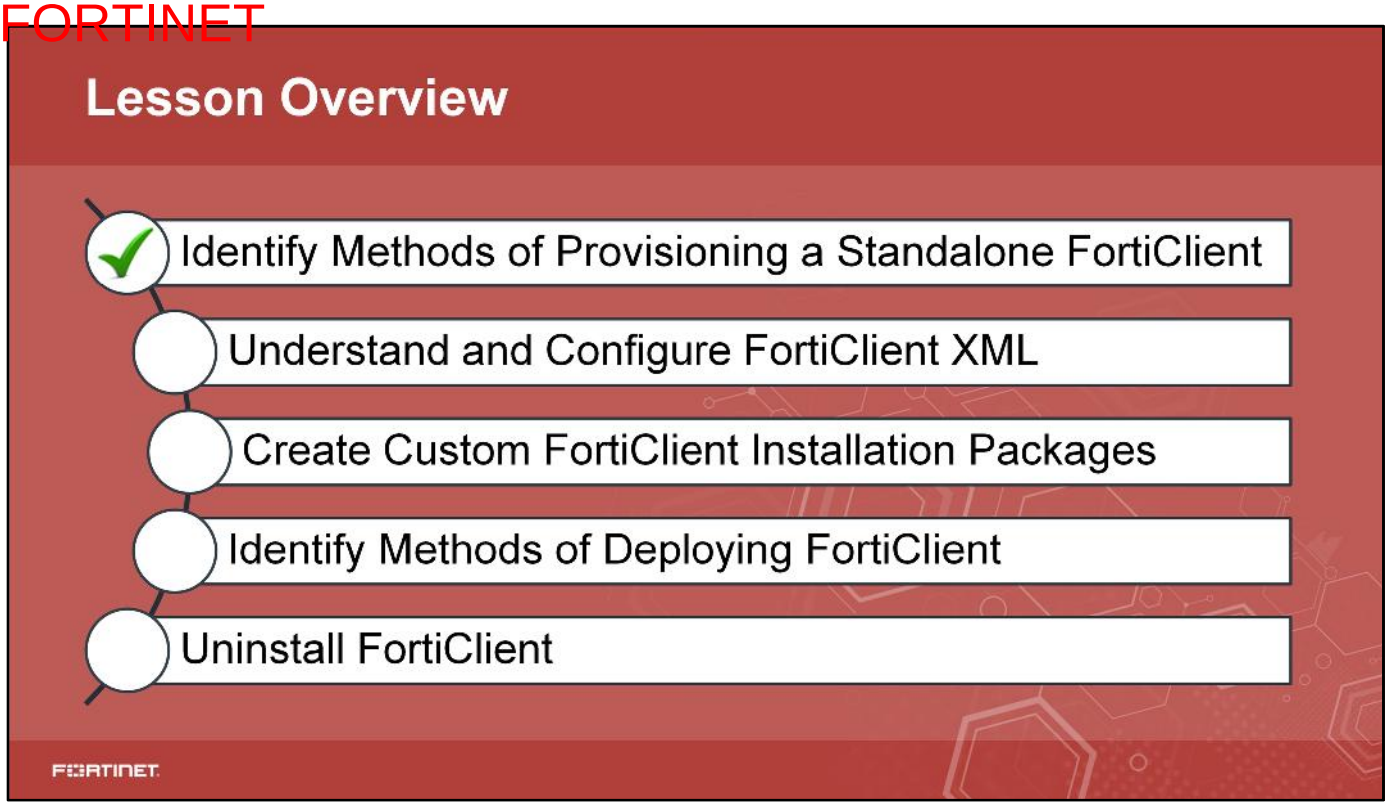


You can use the following methods to provision FortiClients.

- **FortiClient Configurator Tool**: Use to configure FortiClient MSI files.
- **FortiClient Enterprise Management Server**: Use to provision, deploy, and manage endpoints. You will learn about this method later in this lesson.

You can also customize FortiClient installation features using these tools. These tools also allow you to select specific FortiClient features.

Note that the MSI Editor is third-party tool and is not covered in this course.

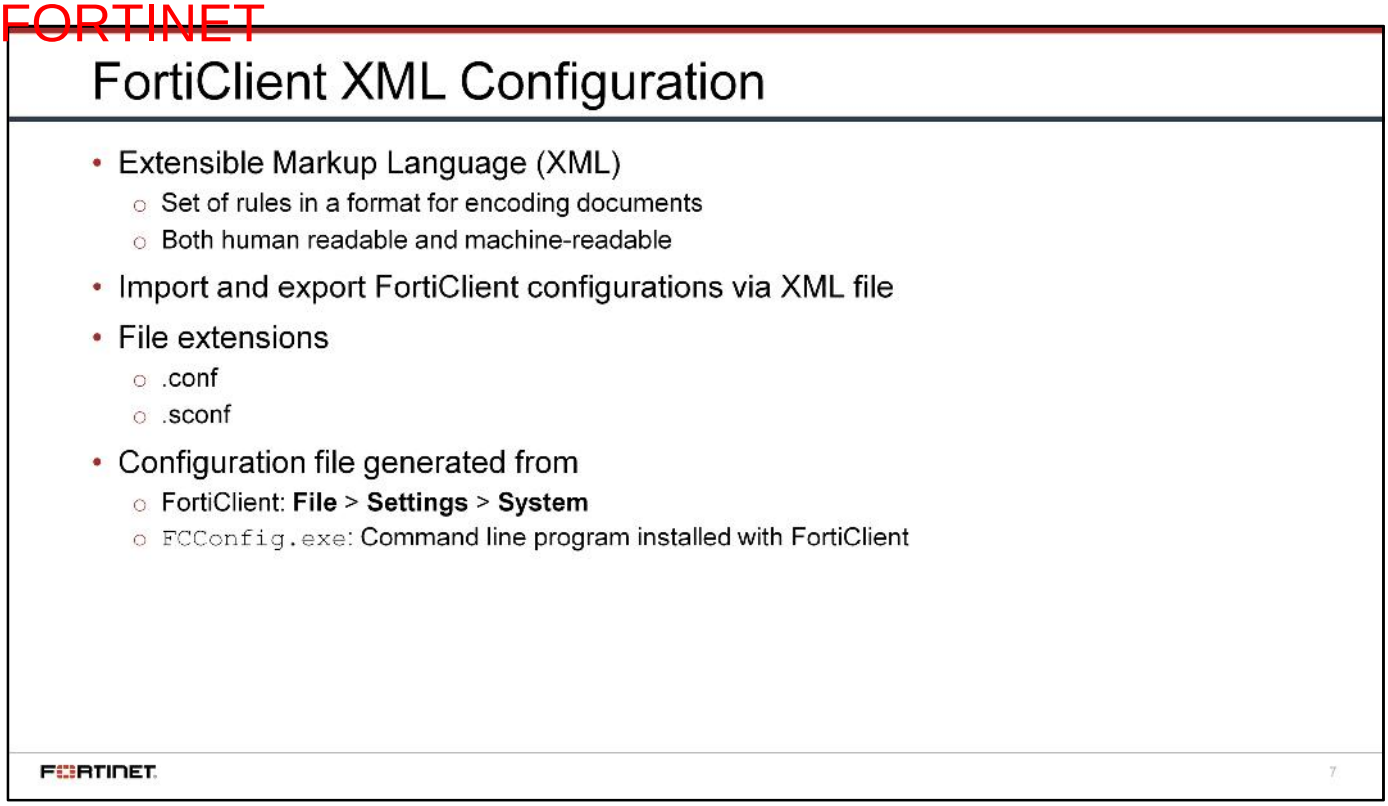


Good job! You now understand how to provision FortiClient.

Now, you will learn how to configure FortiClient XML.

After completing this section, you should be able to achieve the objectives shown on this slide.

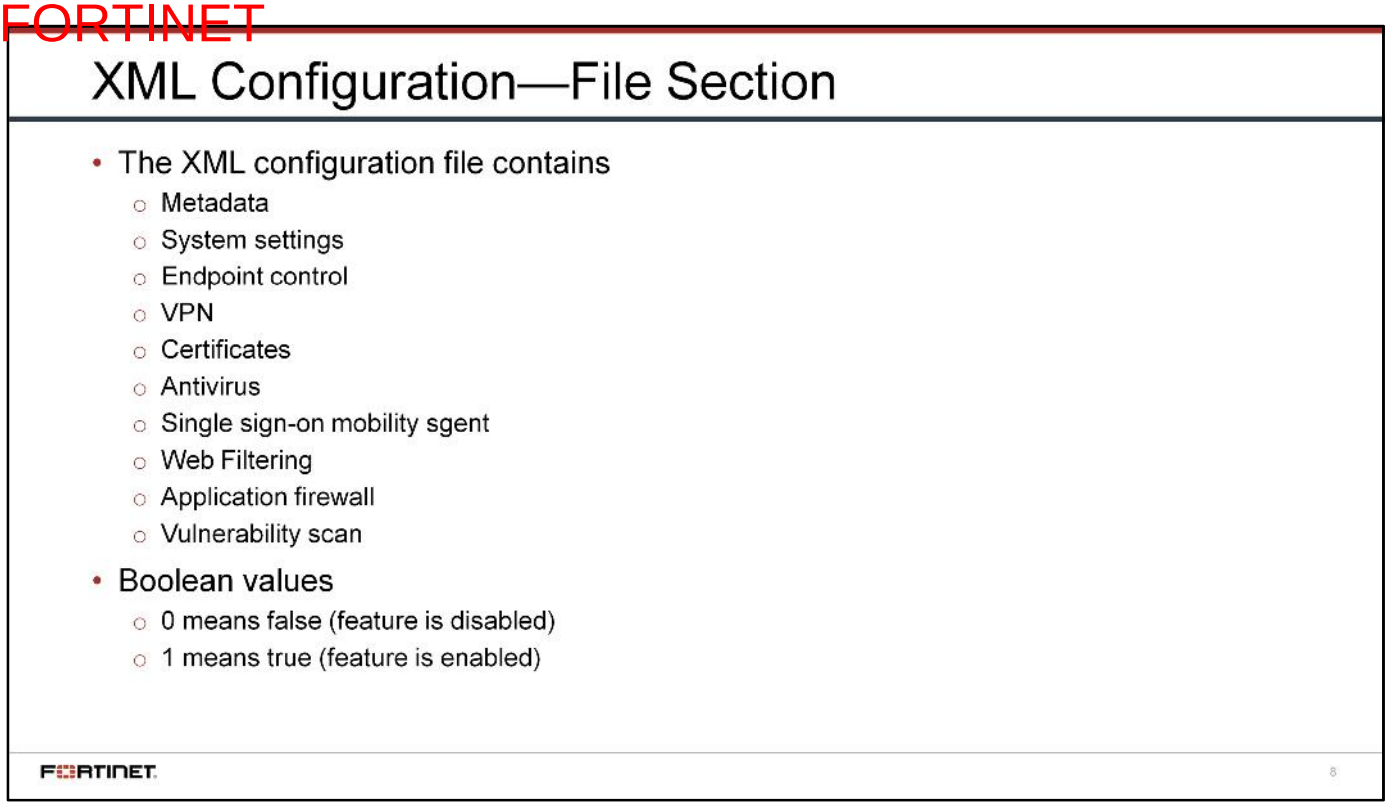
By demonstrating competence in configuring FortiClient XML, you will be able to configure FortiClient XML settings.



XML is a markup language that defines a set of rules for encoding documents in a format that is both human-readable and machine-readable.
FortiClient supports importation and exportation of its configuration in an XML file, and supports two file types, which are:

- **.conf**: A plain-text configuration file.
- **.sconf**: A secure (encrypted) configuration file

You can generate and back up a configuration file (which is an XML file) on the **Settings** page of the FortiClient dashboard, or by using the command-line program `FCConfig.exe`, which is installed with FortiClient.



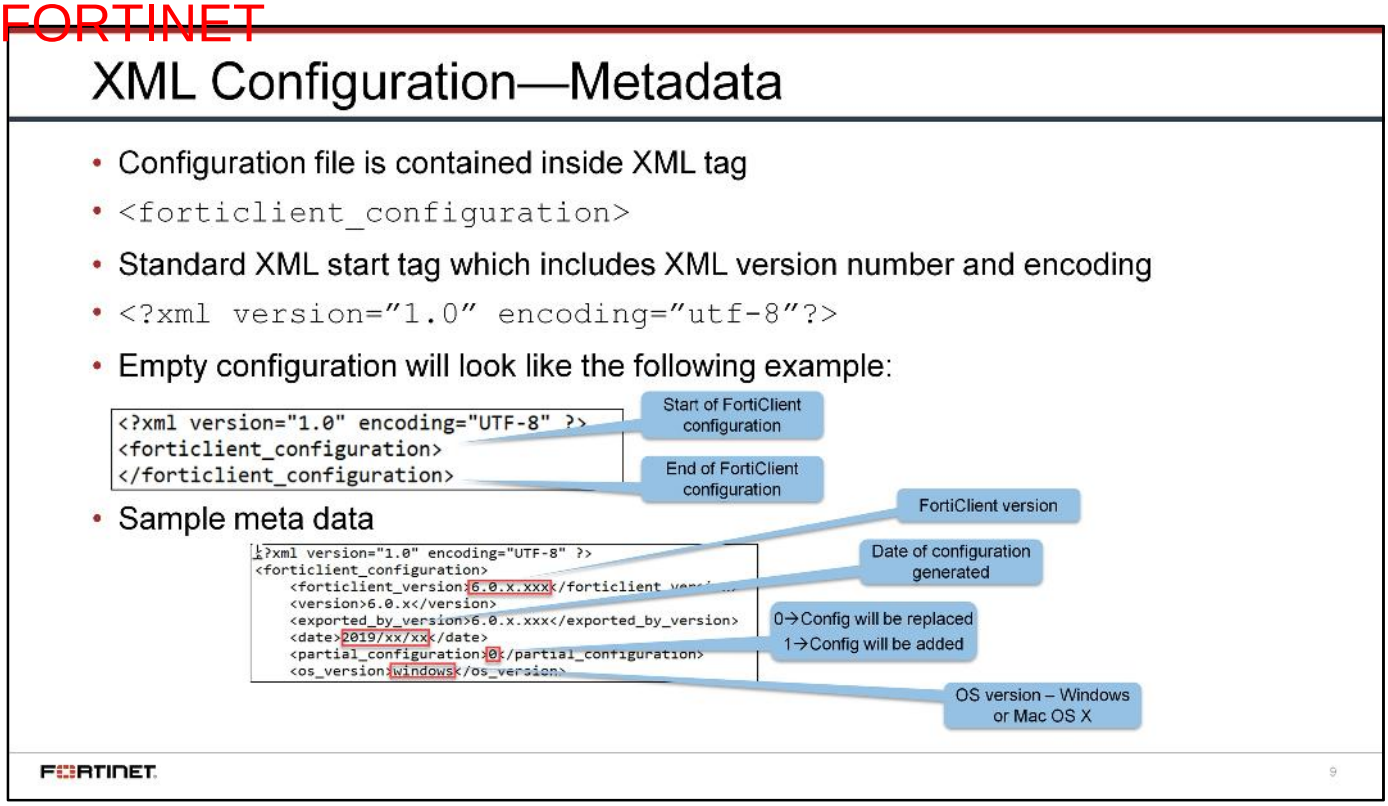
For the purpose of understanding the FortiClient XML configuration, the major sections of the XML configuration are as follows:

- **Metadata**: Facilitates the discovery of relevant information and is basic data controlling the entire configuration file.
- **System settings**: General settings that are not specific to any of the modules listed below (or affect more than one module)
- **Endpoint control**: Includes settings related to controlling endpoints, such as enable enforcement, off-net update, skip confirmation, disable unregister, silent registration, and so on.
- **VPN**: Includes settings related to global options that apply to both SSL VPN and IPsec VPN, and settings related to SSL VPN and IPsec VPN individually.

You can also configure XML for settings related to certificates, antivirus, single sign-on mobility agent, web filtering, application firewall, and vulnerability scan.

The XML configuration is controlled by two boolean values (usually denoted true and false) that enable or disable a configuration setting:
- 0 means false (feature is disabled)
- 1 means true (feature is enabled)

Also in this lesson, you will learn how to enable and disable specific configuration settings.



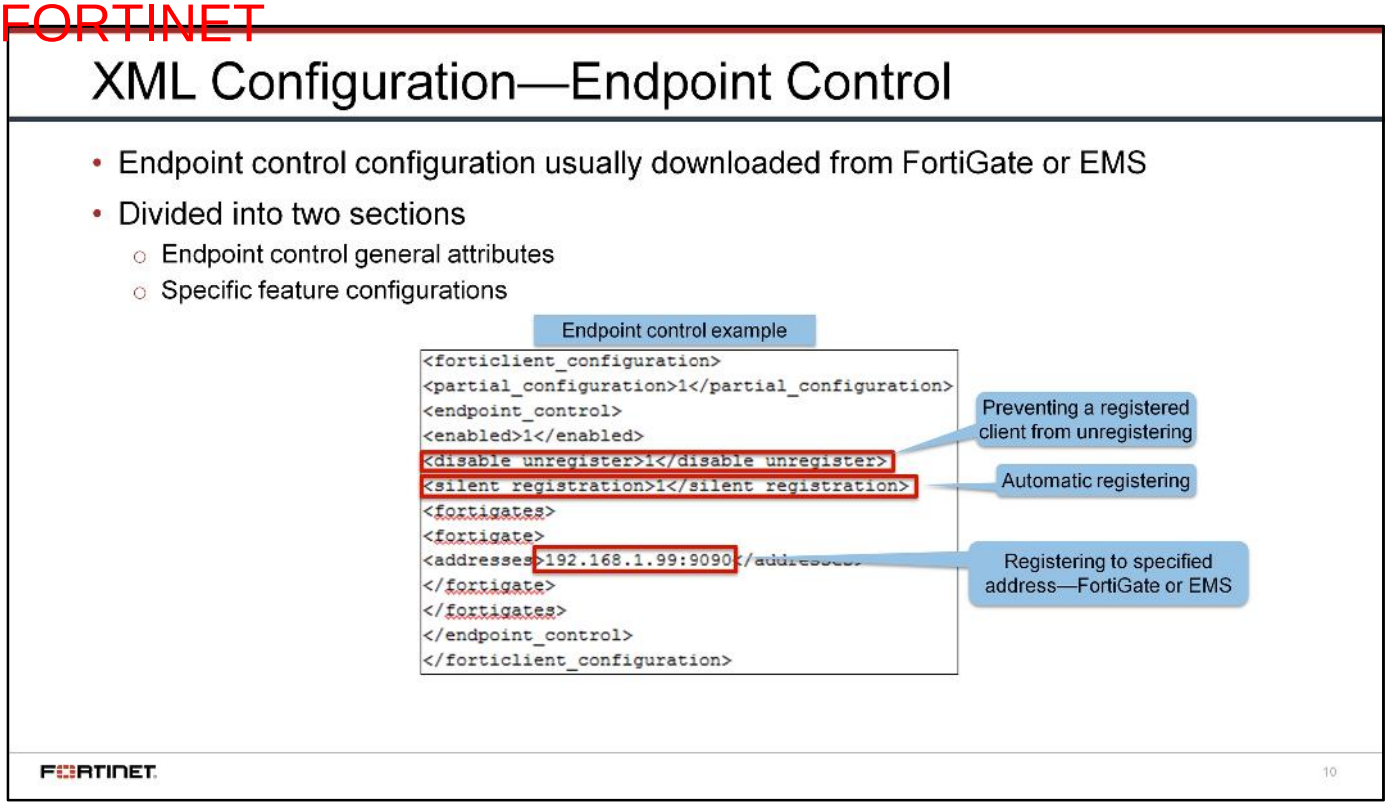
All of the XML tags and data in a configuration file are contained inside the XML tag `<forticlient_configuration>`. The first line of the configuration starts with a standard XML start tag `<?xml version="1.0" encoding="utf-8"?>` which includes the XML version and encoding.

The XML configuration has elements (or nested child elements) that begin with a start tag and end with a matching end tag. An empty FortiClient configuration would look like the following:

```
<?xml version="1.0" encoding="utf-8"?>
<forticlient_configuration>     → Start tag
</forticlient_configuration>    → Matching end-tag
```

If you export the configuration from FortiClient, it will include the FortiClient version, date of generation, and OS version (Windows or Mac OS X) from where the configuration was generated; either FortiGate or FortiClient EMS.

`<partial_configuration> 0` or `1 </partial_configuration>` is a line of metadata that controls whether the configuration will be replaced or added in an import or restore. The value 0 will replace the configuration and the value 1 will append the configuration to the existing configuration.

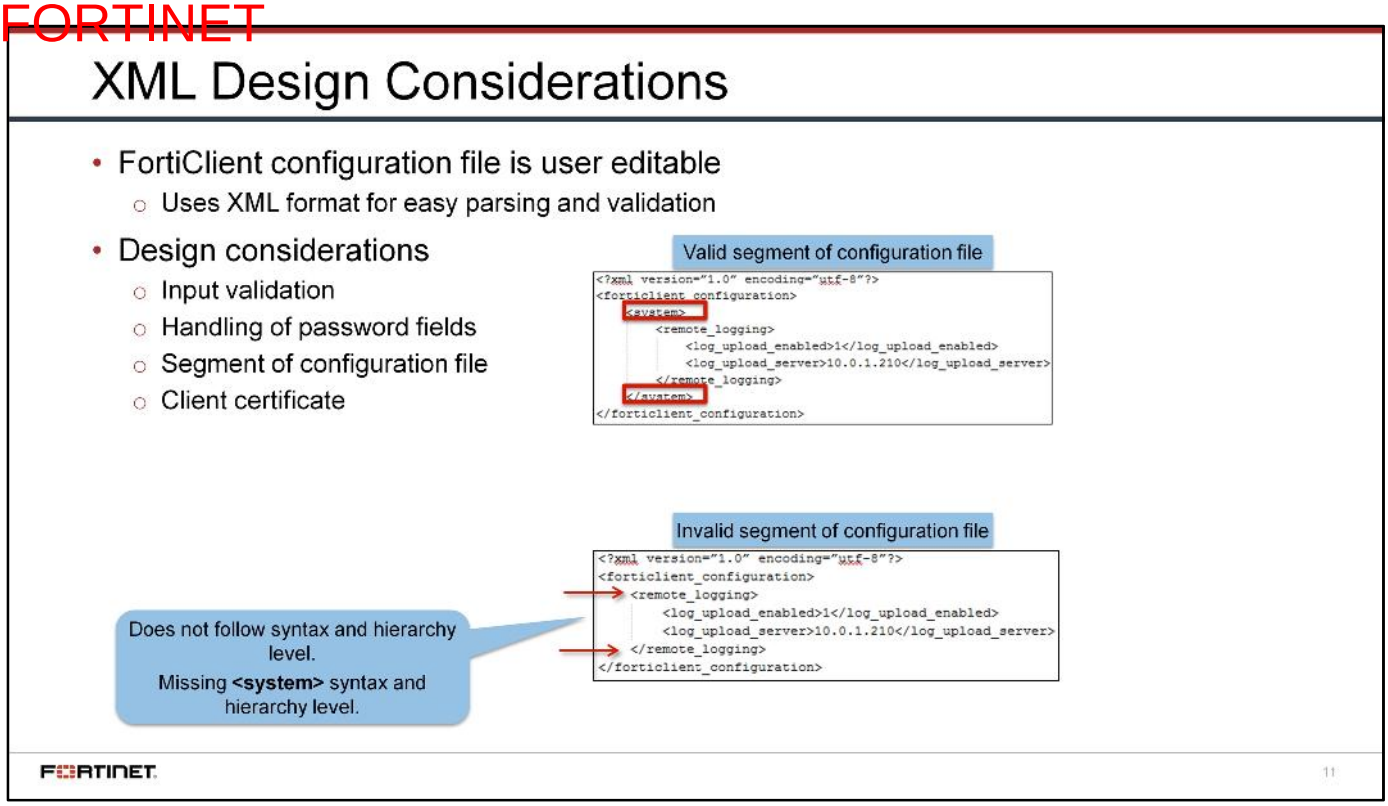


The endpoint control configuration element controls settings related to controlling endpoints such as disable unregister, silent registration, enable enforcement, off-net update, skip confirmation, and which features to display on the FortiClient console, and so on.

You usually download the endpoint control configurations from the FortiGate or EMS or you can build it using the *XML Reference Guide* available at `http://docs.fortinet.com` in the FortiClient XML configuration section.
The endpoint control configurations are divided into two parts:

- Endpoint control general attributes: These are contained in the <endpoint_control></endpoint_control> XML tags.
- Configuration details relating to specific FortiClient services, such as antivirus, web filtering, application firewall, vulnerability scanner, and so on, are found in their respective configuration elements contained inside their XML tags. For example, the antivirus configuration is contained in the <antivirus></antivirus> XML tags.

In the example shown on this slide `silent_registration`, which allows you to automatically register on FortiGate or FortiClient EMS without prompting the user to accept the registration. Silent registration is intended to be used with `disable_unregister`, which prevents a registered client from being able to unregister after successfully registering on a FortiGate or FortiClient EMS server.
The `addresses` XML setting defines that FortiClient will attempt to register on the first FortiGate or EMS listed here. You can add multiple IP's delimited with a semicolon.



The FortiClient configuration file is user editable and includes all client configurations. When building an XML configuration, you should adopt the following design considerations:

- **Input validation**: The import function performs basic validation, and writes to a log when errors or warnings are found. The default values for omitted configurations are ignored, but for VPN they are defined in the configuration.
- **Handling of password fields**: The password and username fields will be encrypted (prefixed with “Enc”) when a configuration is exported; however, the import function is able to take either the clear text or encrypted format.
- **Segment of configuration file**: The XML configuration allows you to import the segment (partial configuration) of a configuration file; however, the segment should follow the syntax and hierarchy defined in the *XML Reference Guide* available at `http://docs.fortinet.com`.

In the example, `invalid segment configuration` file is missing the hierarchy and syntax for `<system>` level commands and is considered to be an invalid segment.

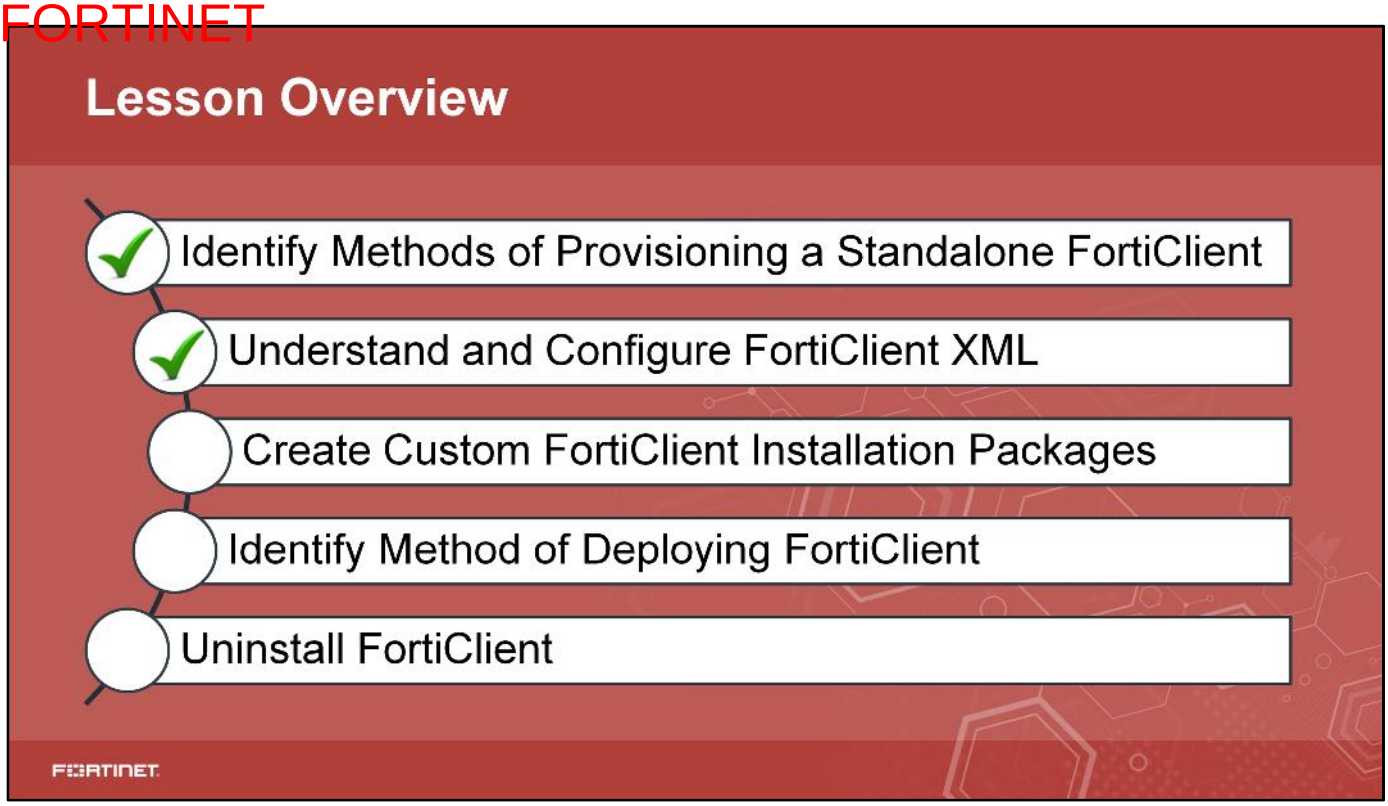
- **Client certificate**: The client certificate(s) are exported in an encrypted format in the configuration file.

Knowledge Check

1. In XML, feature configuration is controlled by?
   - A. Decimal value
   - ✓ B. Boolean value

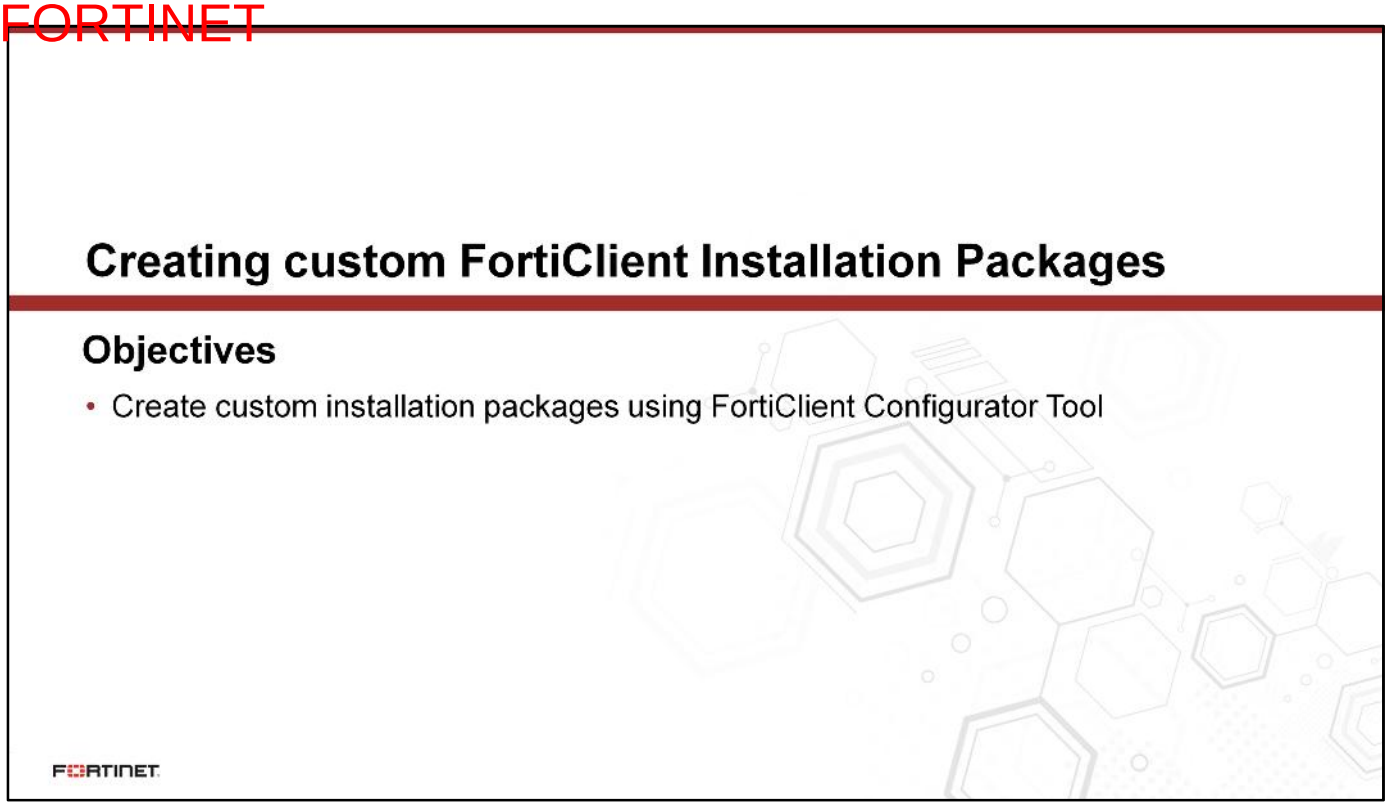
2. Which two parts make up the endpoint control configuration?
   - ✓ A. Endpoint control general attributes and specific feature configurations
   - B. Metadata and system settings

FORTINET 12



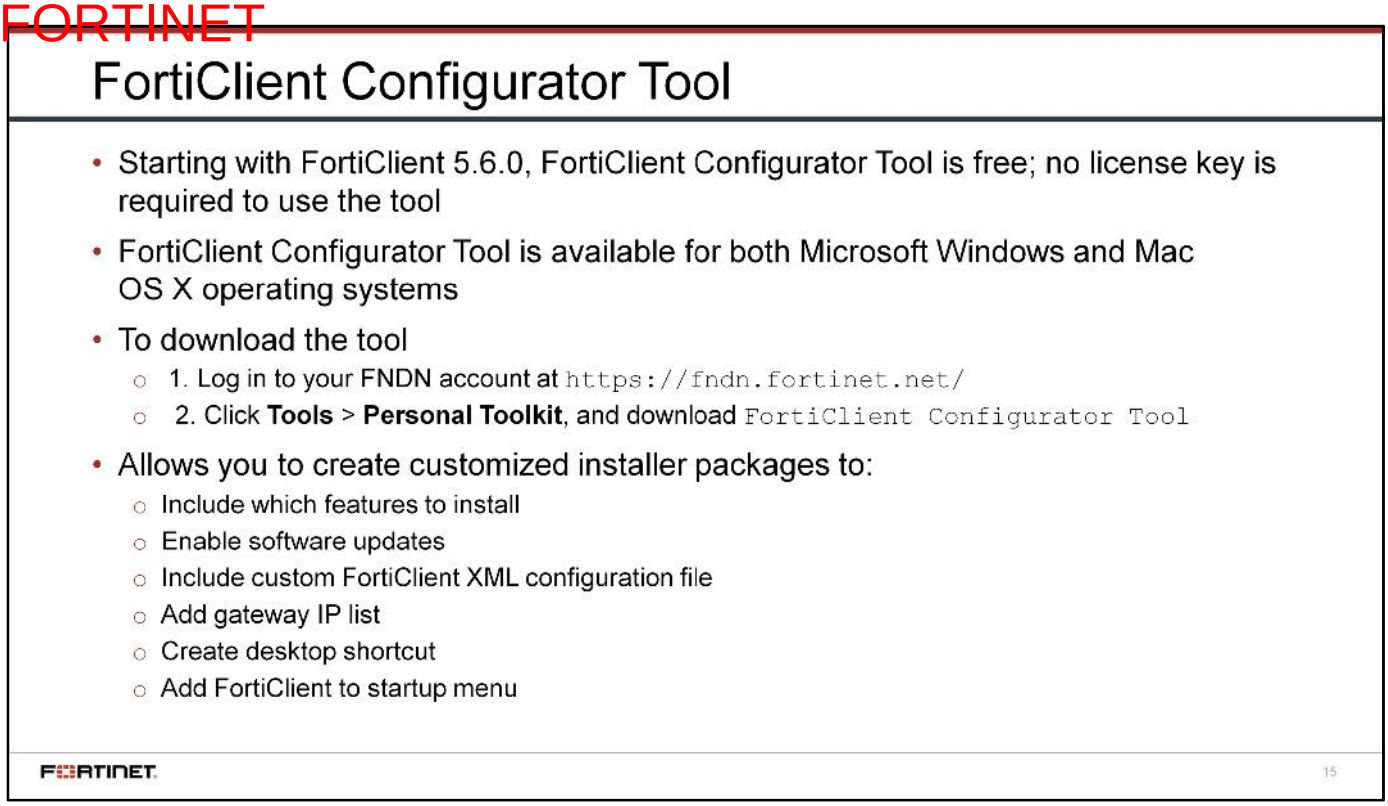
Good job! You now understand how to configure FortiClient XML.

Now, you will learn how to use FortiClient Configurator Tool to create custom installation packages.



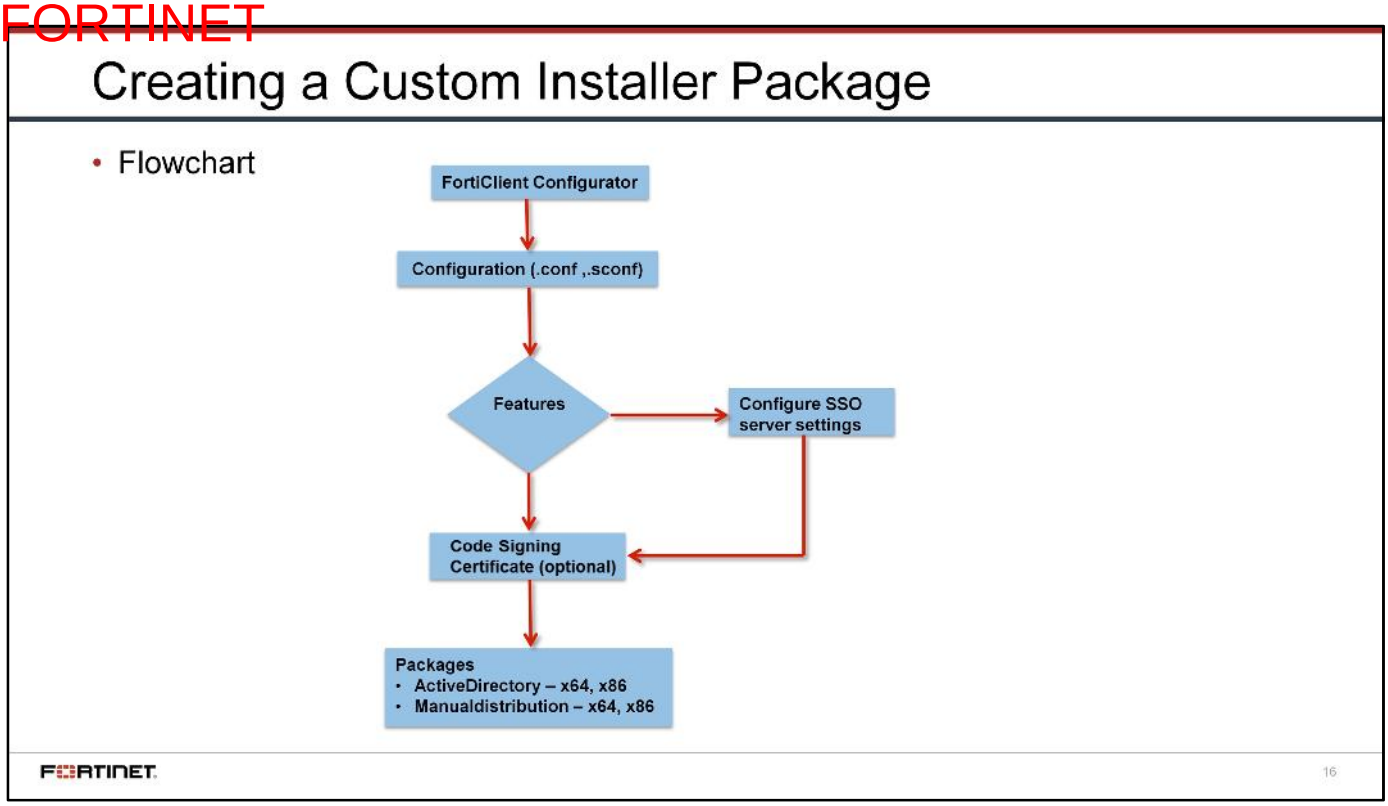
After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in creating custom FortiClient installation packages, you will be able to create and configure installation packages using FortiClient Configurator Tool.



The following steps provide an overview of how you use the FortiClient Configurator Tool:

1. Log in to your FNDN account, and download the tool from FNDN.
   - If you do not have an account for FNDN, you must create an account at `https://fndn.fortinet.net/index.php?/register/`. When you create an FNDN account, you are required to include the email address of two Fortinet sponsors. Fortinet sponsors are Fortinet employees who can verify that you are a Fortinet customer. Contact your sales representative or sales engineer for the email addresses of Fortinet sponsors.
2. You have the option to add a FortiClient configuration file and/or a telemetry gateway IP list to the FortiClient installer. Before you create the installer, you should get these files ready for selection.
3. Create a custom FortiClient installer.
4. Deploy the custom FortiClient installation packages.



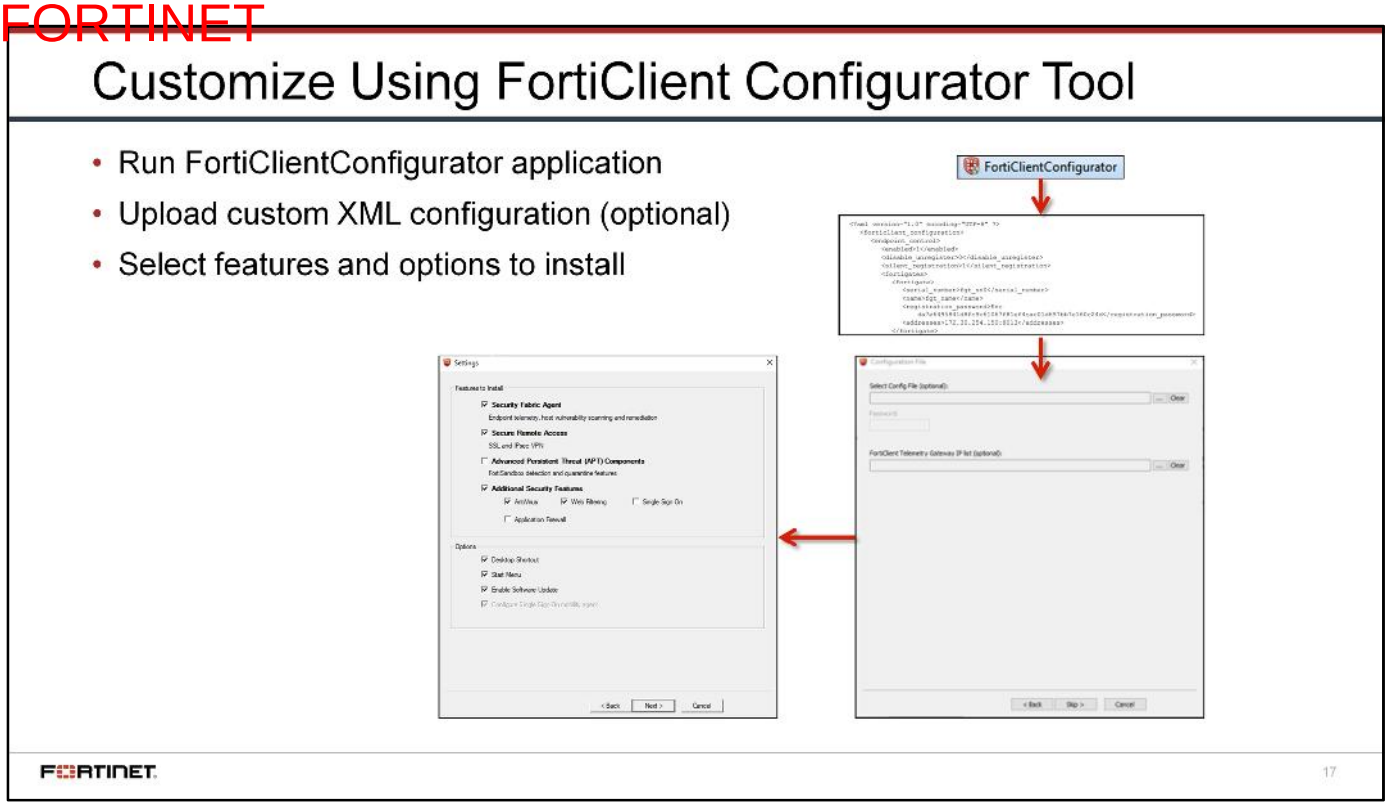
This flowchart on this slide shows the process to create a custom FortiClient installer package using FortiClient Configurator Tool.

As you can see, FortiClient Configurator Tool allows you to select an XML configuration file, select features and options, and create packages for Active Directory and manual distribution for both x64 and x86 system versions.

When you select custom features to install, only the modules you select are installed. To enable other features, you will need to uninstall FortiClient, and reinstall an MSI file with these features, included in the installer.

As a general recommendation, it is good to install all features and activate only the modules which are required. Doing this gives you the flexibility to enable unused features in the future.

Note that FortiClient 6.0 was introduced with a new GUI and no longer supports the rebranding tool.

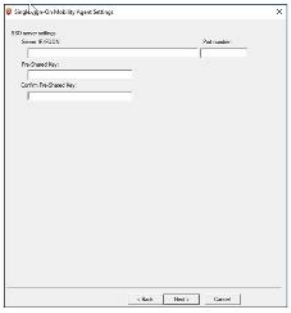


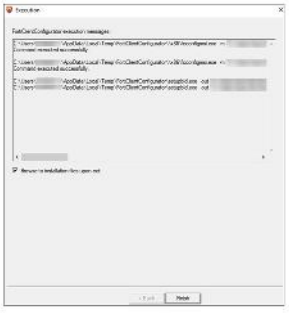
The following are the steps involved in creating a custom installer package using FortiClient Configurator Tool:

1. Run the `FortiClient-Configurator` application.
2. Optionally, add a configuration file (.conf, .sconf), which will be included in the installer file.
3. Select the features you want to install:
    - **Security Fabric Agent**: Endpoint telemetry, host vulnerability scanning, and remediation. By default, selected to support Fortinet Security Fabric.
    - **Secure Remote Access**: Only SSL and IPSec VPN will be installed.
    - **Advanced Persistent Threat:** FortiSandbox detection and quarantine features will be installed.
    - **Additional Security Features**: You can select one of the following:
        - **AntiVirus**
        - **Web Filtering**
        - **Application Firewall**
        - **Single SignOn**
    - Options such as **Desktop shortcut**, **add FortiClient to start menu**, and **enable software updates**.

Customize Using FortiClient Configurator Tool

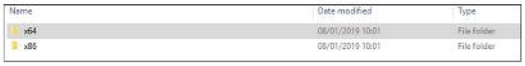
- SSO server settings
  - Server IP address
  - Port number
  - Pre-shared key





- Select code signing certificate (optional)
  - Select the code signing certificate on your management computer

- Creates packages for
  - Active Directory: x86, x64
  - Manual distribution: x86, x64



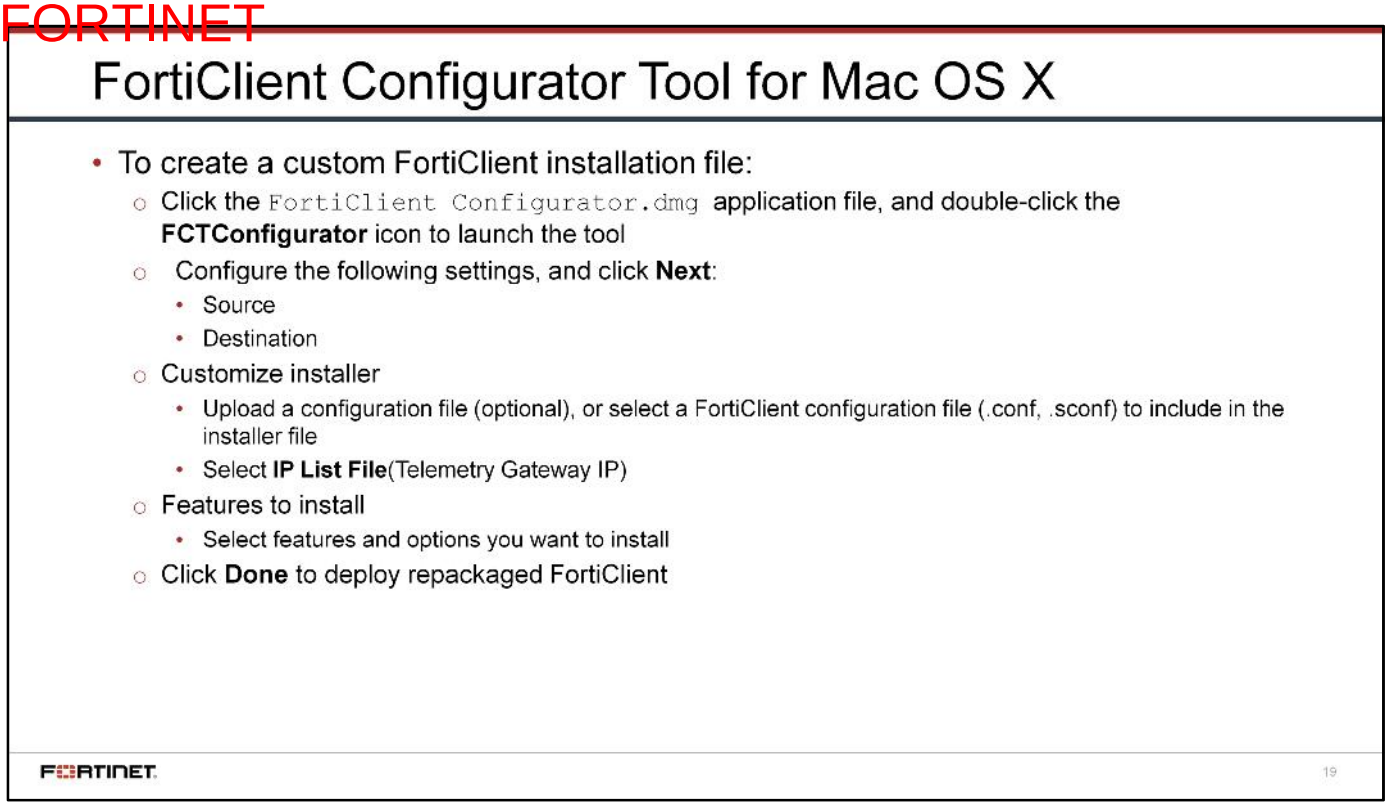
FORTINET 18

You can also select SSO server settings if you need to install an SSO agent.

If you have a code signing certificate, you can use it to digitally sign the installer package FortiClient Configurator Tool generates. If you do not want to digitally sign the installer package, select **Skip** to continue.

Finally, clicking on finish will create a custom installer package for both manual distribution and Active Directory for Windows (x64 and x86). The file location will be: `C:\Users\Fortinet\Downloads\FortiClientConfigurationTool_6.0.X.XXX\repackaged\6.0.X.XXX-EPC-VULN-VPN-AV-WF_<Date>`.

FortiClient Configurator Tool creates files for both 32-bit (x86) and 64-bit (x64) operating systems. Before deploying the custom MSI files, you should test the packages to confirm that they install correctly. An `.exe` installation file is created for manual distribution.



The steps are similar to a Windows custom installation package, except for a few settings.

- **Source:** Select the FortiClient installer file on your management computer. You must use the full installer file; otherwise, FortiClient Configurator Tool will fail to create a custom installation file. The FortiClient installer version and FortiClient Configurator Tool version must match; otherwise, FortiClient Configurator Tool will fail to create a custom installation file.
- **Destination:** Enter a name for the custom installation file and select a location to save the file to your management computer.

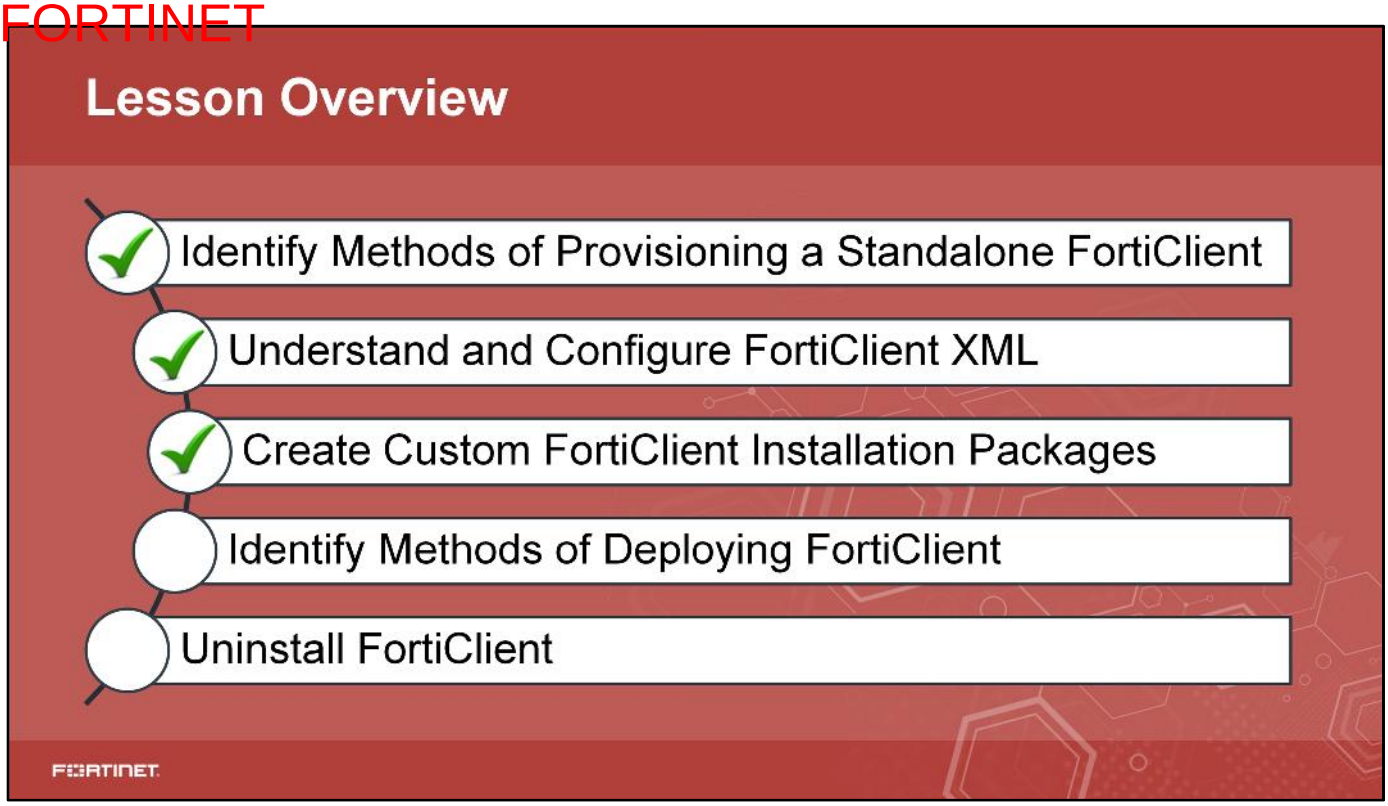
- Features include:
  - **Security Fabric Agent**: Endpoint telemetry, host vulnerability scanning, and remediation. By default selected to support the Fortinet Security Fabric.
  - **Secure Remote Access**: Only SSL and IPSec VPN will be installed.
  - **Advanced Persistent Threat:** FortiSandbox detection and quarantine features will be installed.
  - **Additional Security Features**: You can select one of the following in the drop-down list:
    - **AntiVirus**
    - **Web Filtering**
    - **Application Firewall**
    - **Single SignOn**
  - You can select options such as **Single Sign-On** mobility agent and **enable software updates**.

For Mac OS, FortiClient Configurator Tool will generate the `.dmg` file.

Knowledge Check

1. FortiClient Configurator Tool creates which Windows OS file(s)?
   - A. .dmg
   - ✓ B. Both 32-bit and 64-bit

2. Which file is used for manual distribution?
   - A. .msi
   - ✓ B. .exe

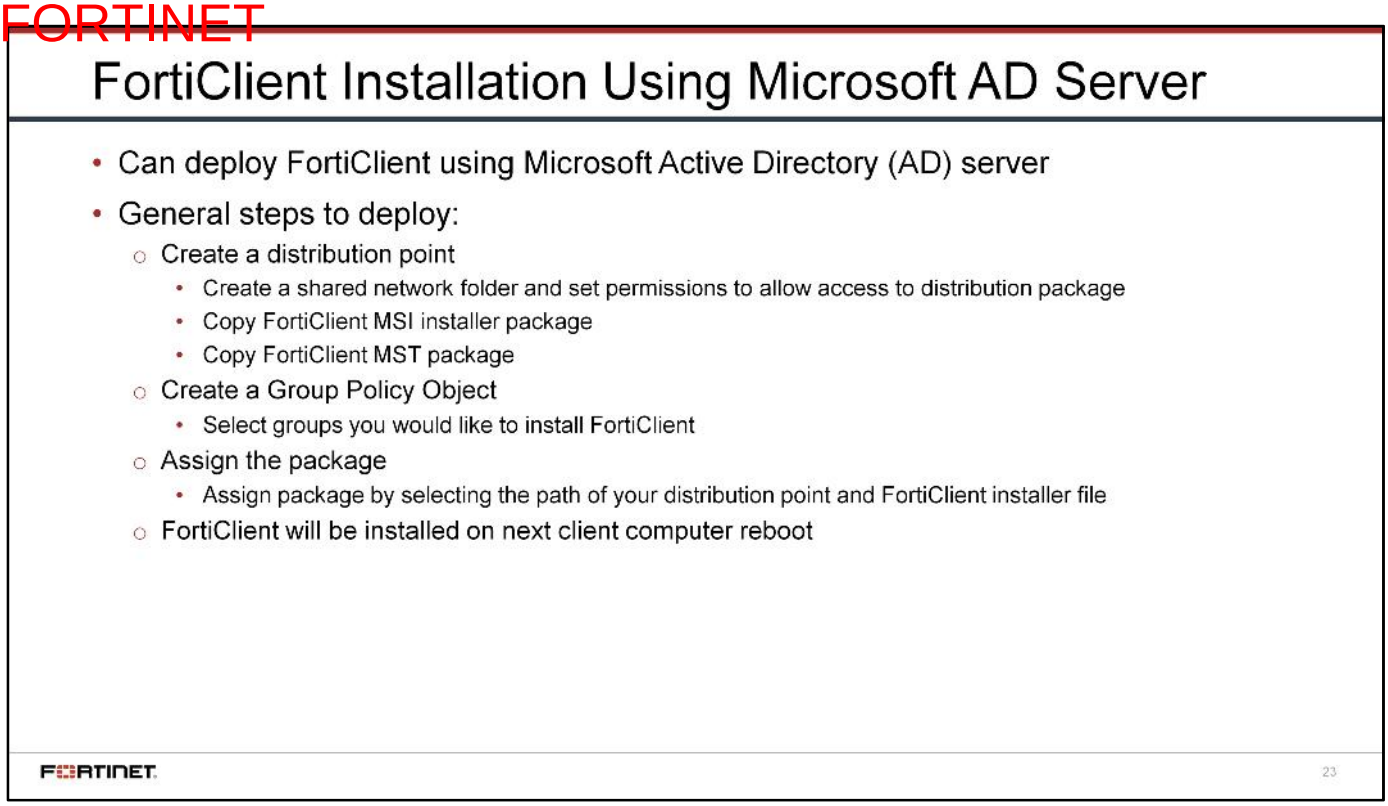


Good job! You now understand how to use the FortiClient Configurator Tool to create custom installation packages.

Now, you will learn about methods of deploying FortiClient.

After completing this section, you should be able to achieve the objective shown on this slide.

By demonstrating competence in deploying FortiClient, you will be able to use different methods of deploying FortiClient.

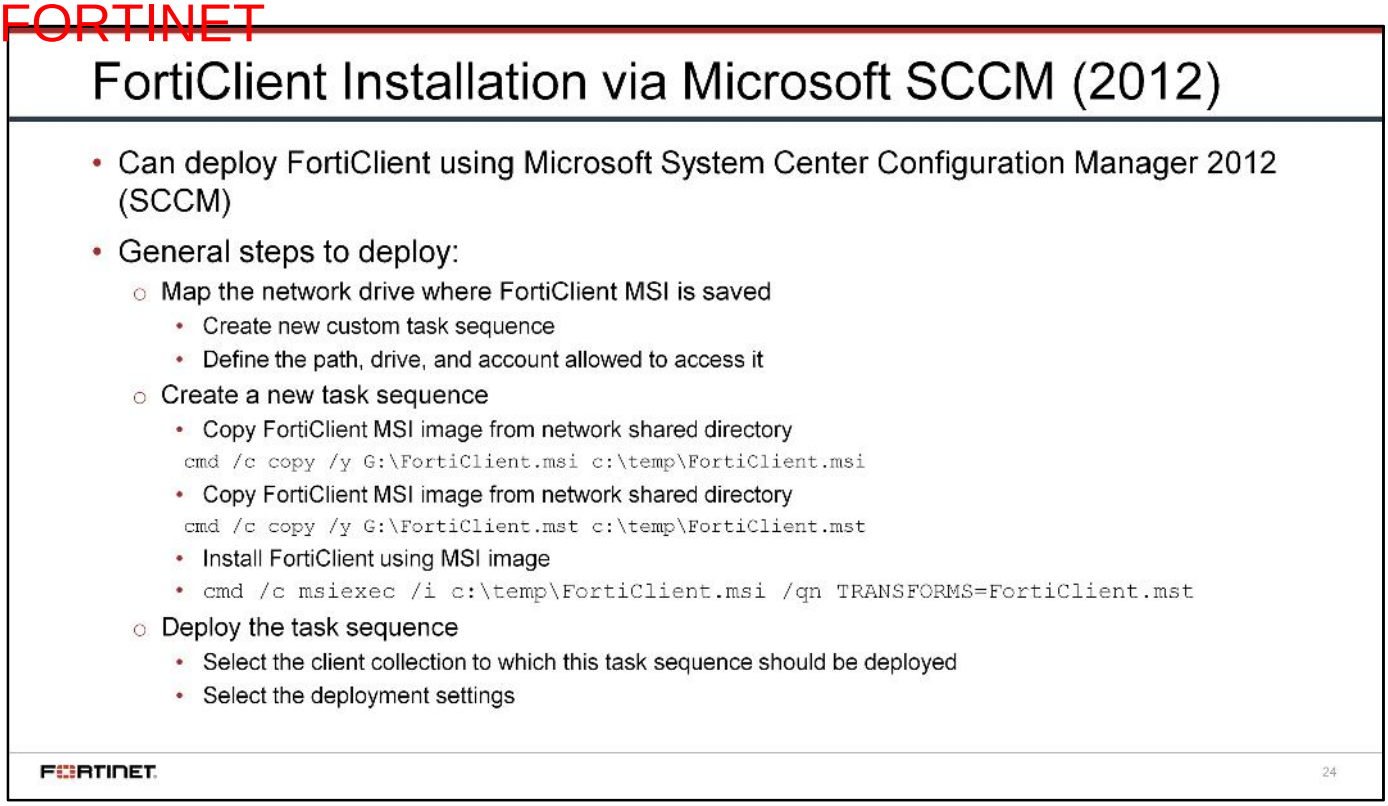


You can also deploy FortiClient to endpoints using a Microsoft AD server. The general steps to deploy FortiClient using a Microsoft AD server are as follows:

- Create a distribution point
- Create Group Policy
- Assign the package

Note that these steps may vary based on your version of Microsoft server, Microsoft Management Console (MMC), or snap-in location.

TIP: If you want to expedite the installation process, you can force a Group Policy Object (GPO) update.



You can also deploy and manage multiple FortiClient installations using the SCCM. The general steps to deploy FortiClient using the Microsoft System Center 2012 Configuration Manager (SCCM) are as follows:

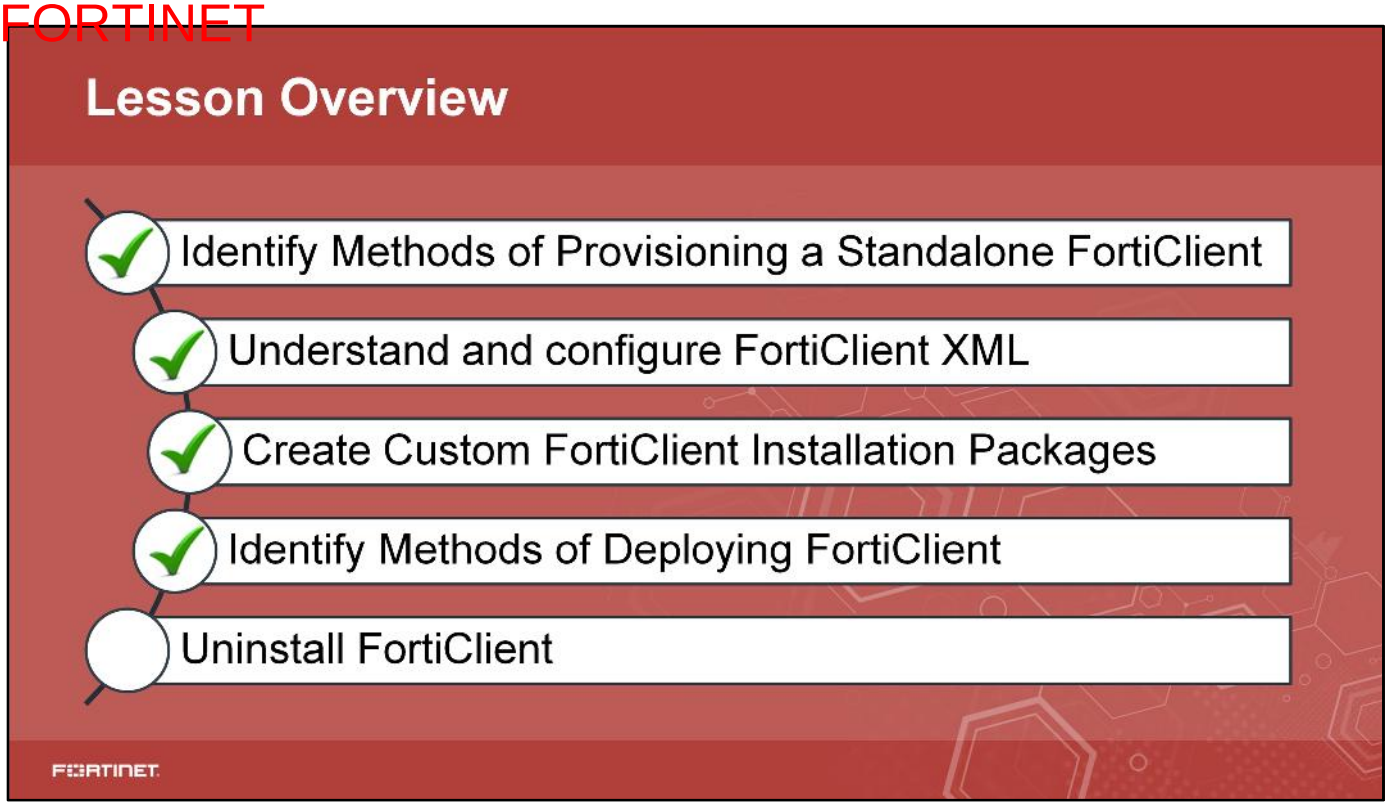
- Map the network drive where FortiClient MSI and FortiClient MST are saved
- Create a new task sequence
- Deploy the task sequence

Note that these steps may vary based on your configuration on Microsoft SCCM.

Knowledge Check

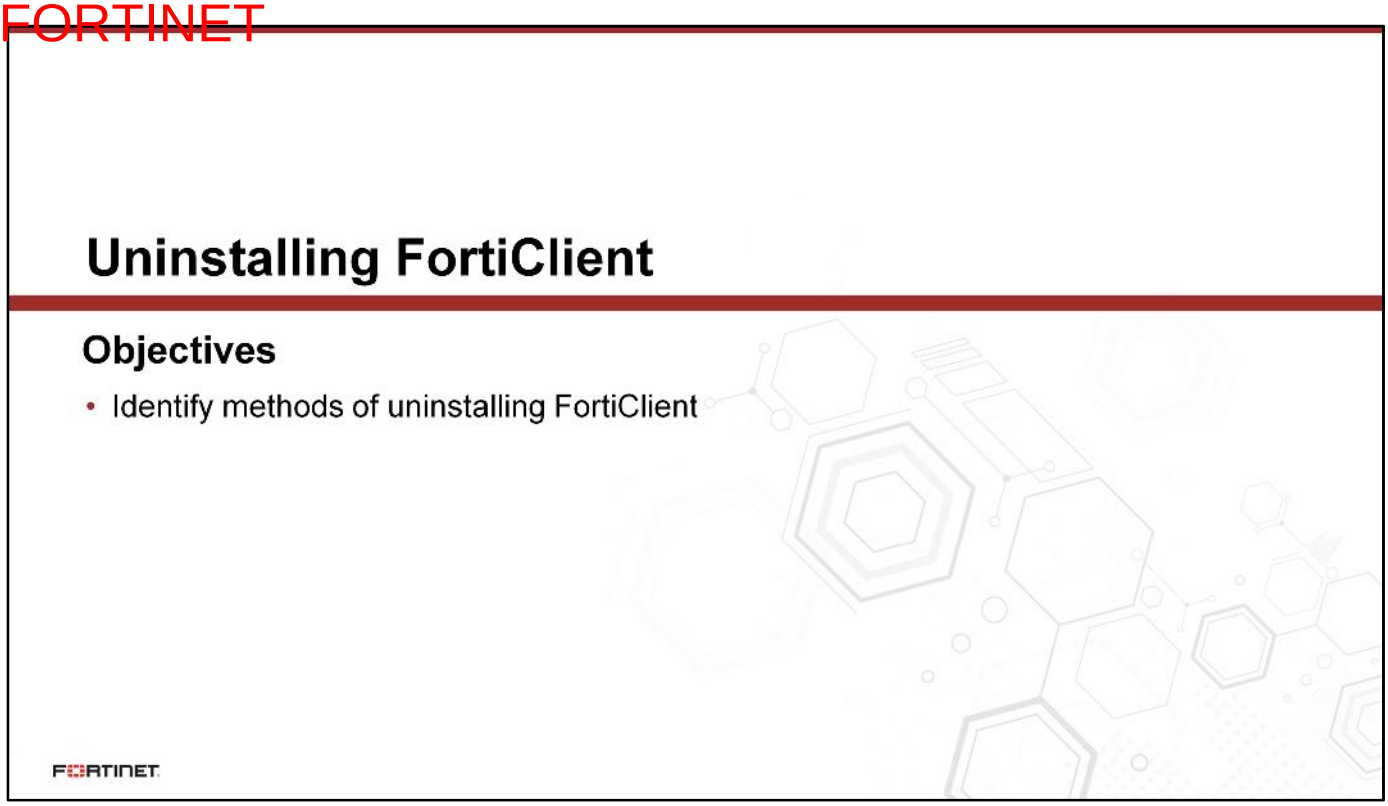
1. Which of the following can deploy FortiClient?
   - ✓ A. Microsoft AD server
   - B. FortiClient Configurator Tool

2. What are the steps to deploy a FortiClient from the Microsoft SCCM?
   - ✓ A. Map the network drive where FortiClient MSI is saved, create a new task sequence, and the deploy the task sequence.
   - B. Create a distribution point, configure a group policy, and then assign the package.



Good job! You now understand how to deploy FortiClient.

Now, you will learn how to uninstall FortiClient.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in uninstalling FortiClient, you will be able to uninstall FortiClient on the management computer.

Uninstall FortiClient

- Standard installation
  - Windows
    - Control panel > Programs and Features
  - Mac OS X
    - Drag the FortiClient application from **Applications directory** to the trash
- FortiClient EMS
  - Creating uninstall endpoint profile
  - Apply to domain or workgroup
  - FortiClient must be password unlock
- Microsoft AD using Group Policy Management
- Microsoft SCCM 2012 using task sequence
  - wmic product where name="FortiClient" call uninstall /nointeractive

FORTINET 28

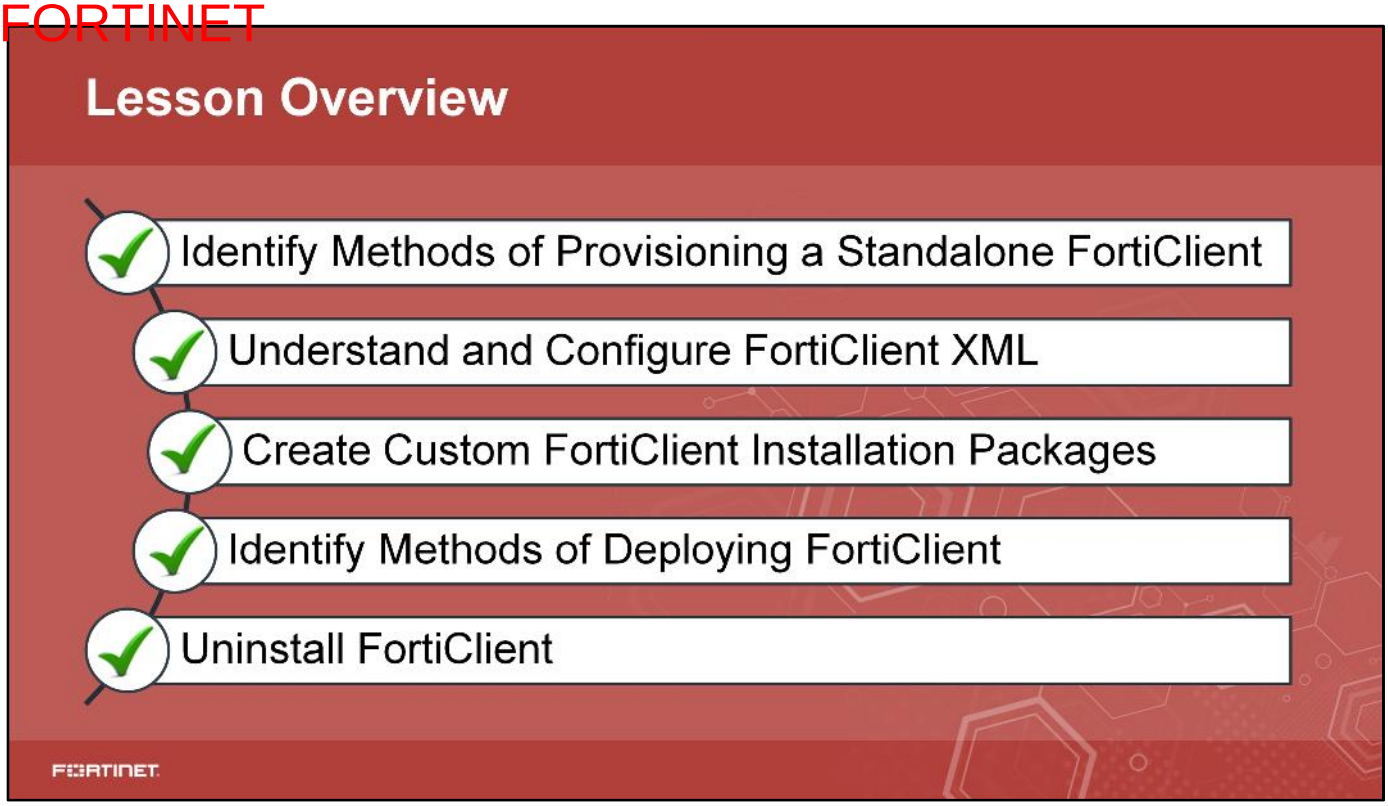
The uninstall process is similar to uninstalling any software from your computer. For Windows, you can uninstall FortiClient in **Add/Remove programs** on the **Control Panel**.

For Mac OS X, drag the FortiClient application from **Applications directory** to the trash.

You can also uninstall FortiClient from the EMS by creating an endpoint profile containing a predefined uninstall installer and applying the uninstaller to the workgroup or domain. FortiClient must be password unlock.

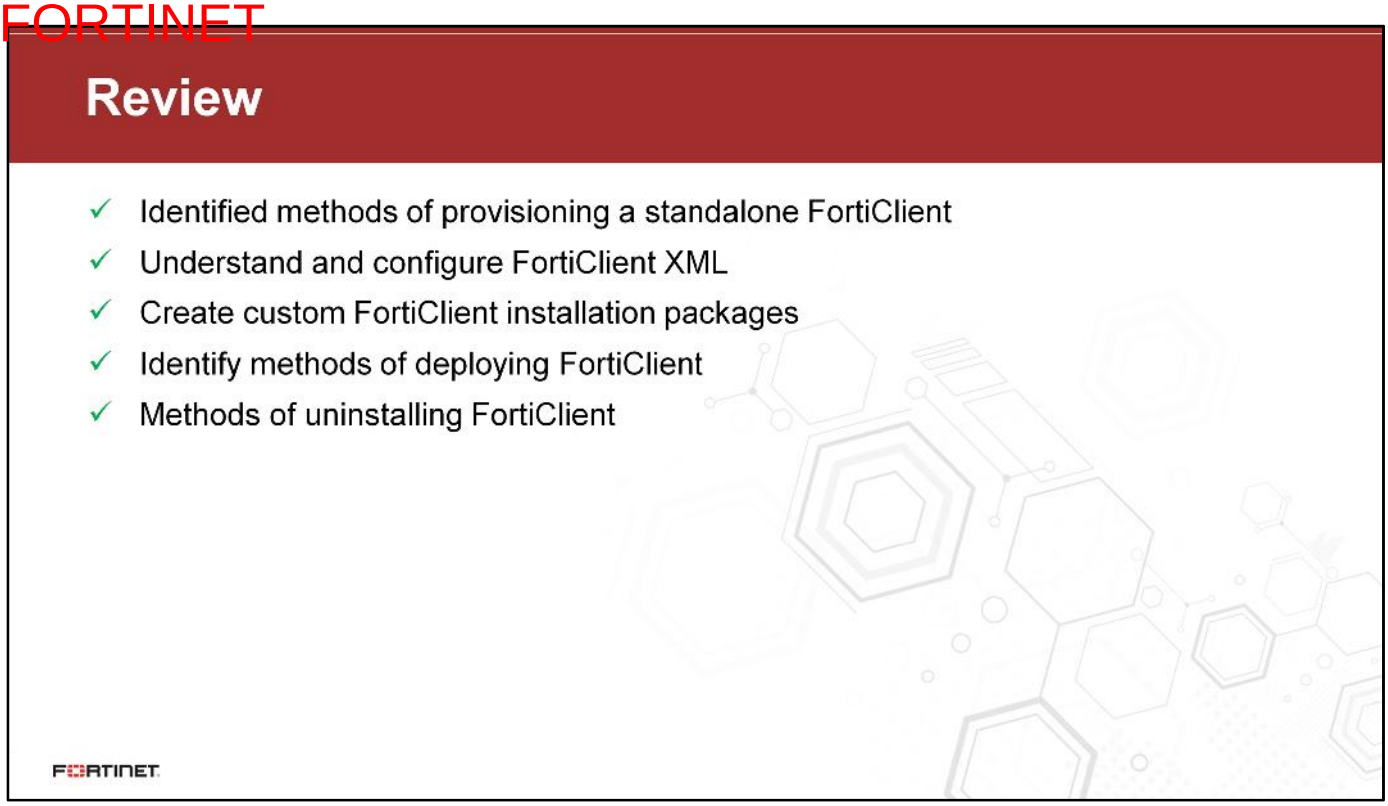
You can uninstall FortiClient from Microsoft AD using Group Policy Management or from Microsoft SCCM 2012 using task sequence.

When you select custom features to install, only the modules you select are installed. To enable other features, you will need to uninstall FortiClient, and reinstall an MSI file that includes these features in the installer.



Congratulations! You have completed this lesson.

Now, you will review the objectives that you covered in this lesson.

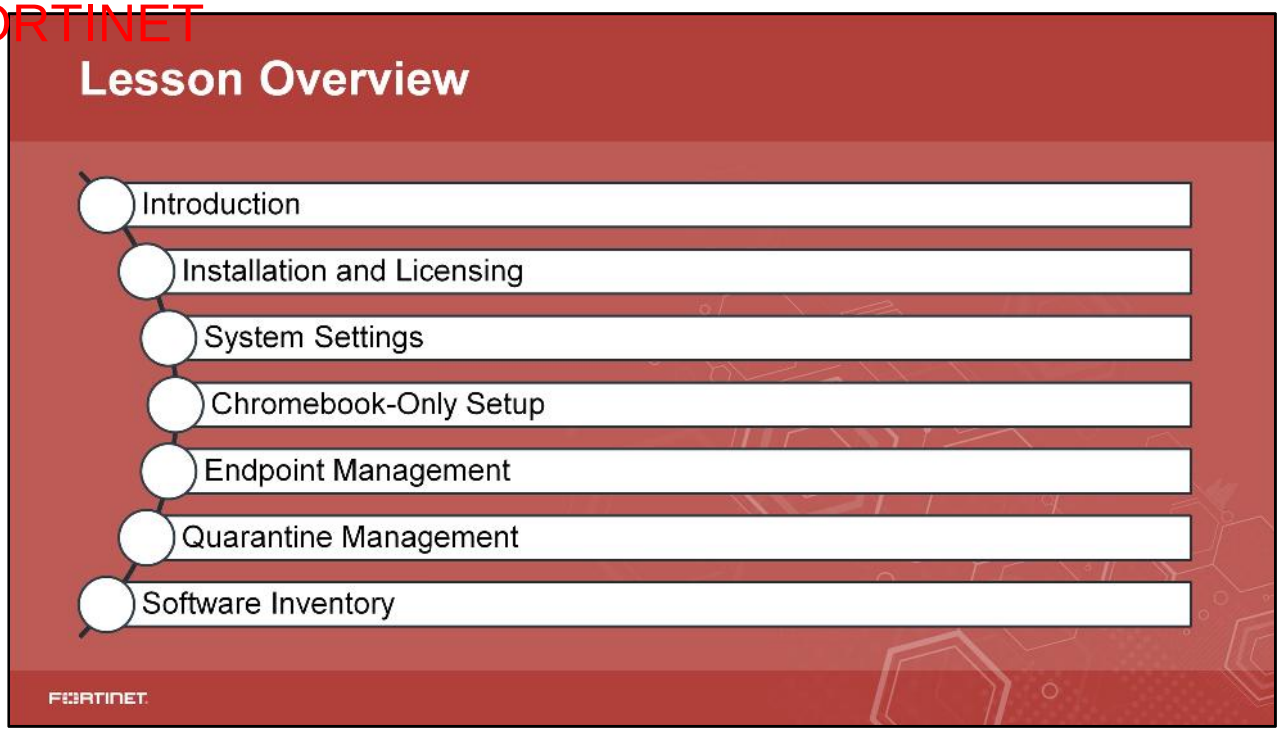


This slide shows the objectives that you covered in this lesson.

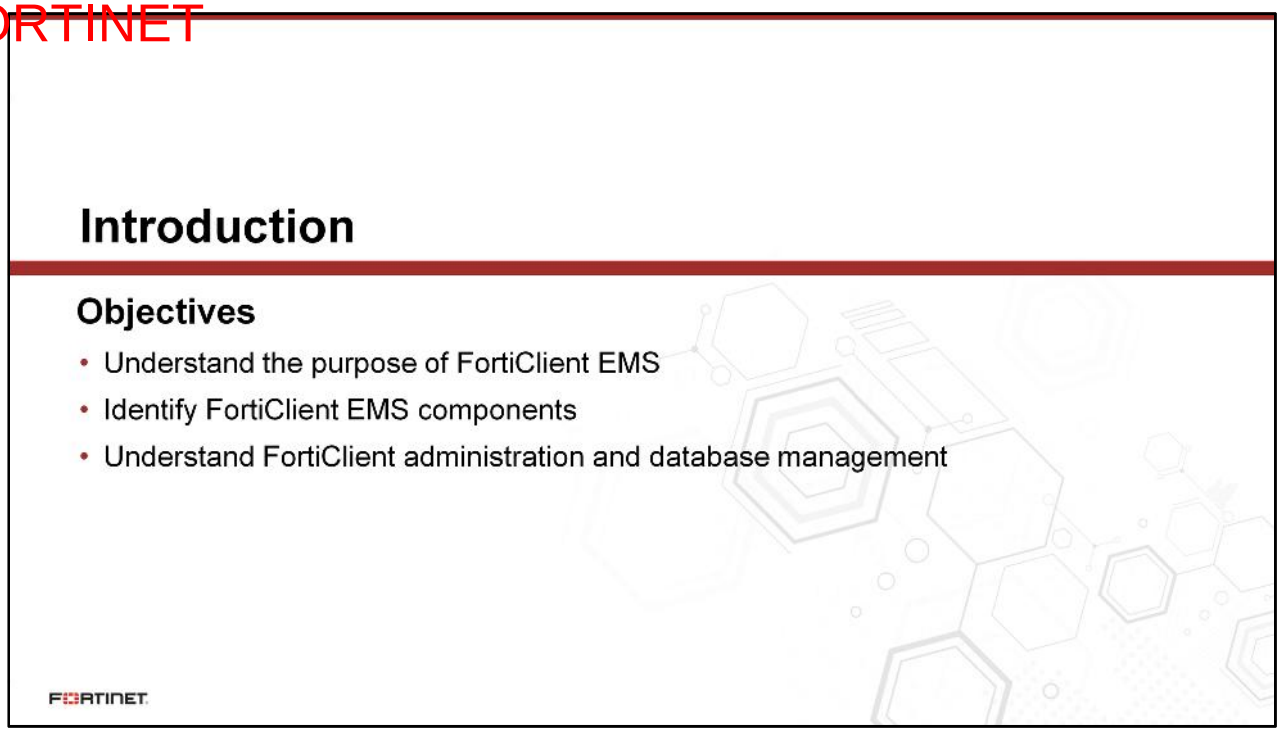
By mastering the objectives covered in this lesson, you learned how to provision and deploy a standalone FortiClient in your existing network to manage the security of multiple endpoints.

In this lesson, you will learn how to install, configure, and administer FortiClientEMS. You will also learn how to manage a large number of endpoints.

Although this lesson introduces the main FortiClient EMS components and key features, its objectives are about understanding and implementing these features.

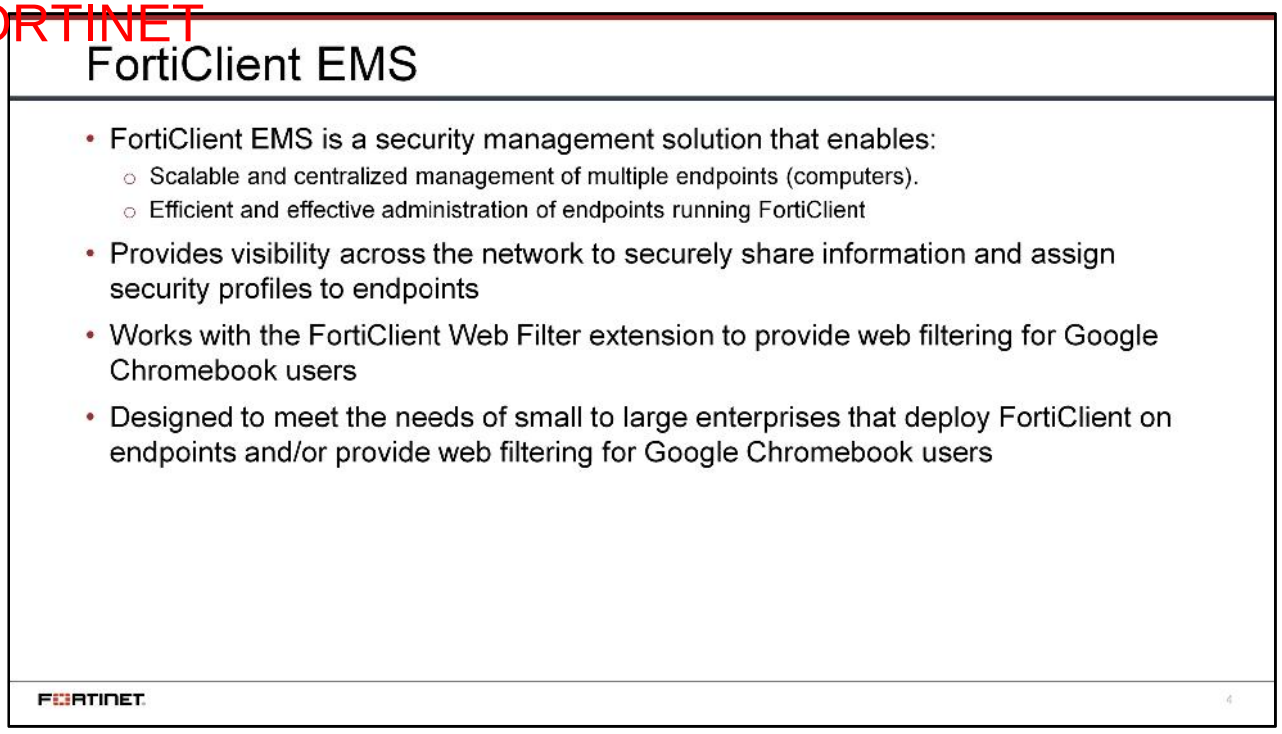


In this lesson, you will learn about the topics shown on this slide.



After completing this section, you should be able to achieve the objectives shown on this slide.

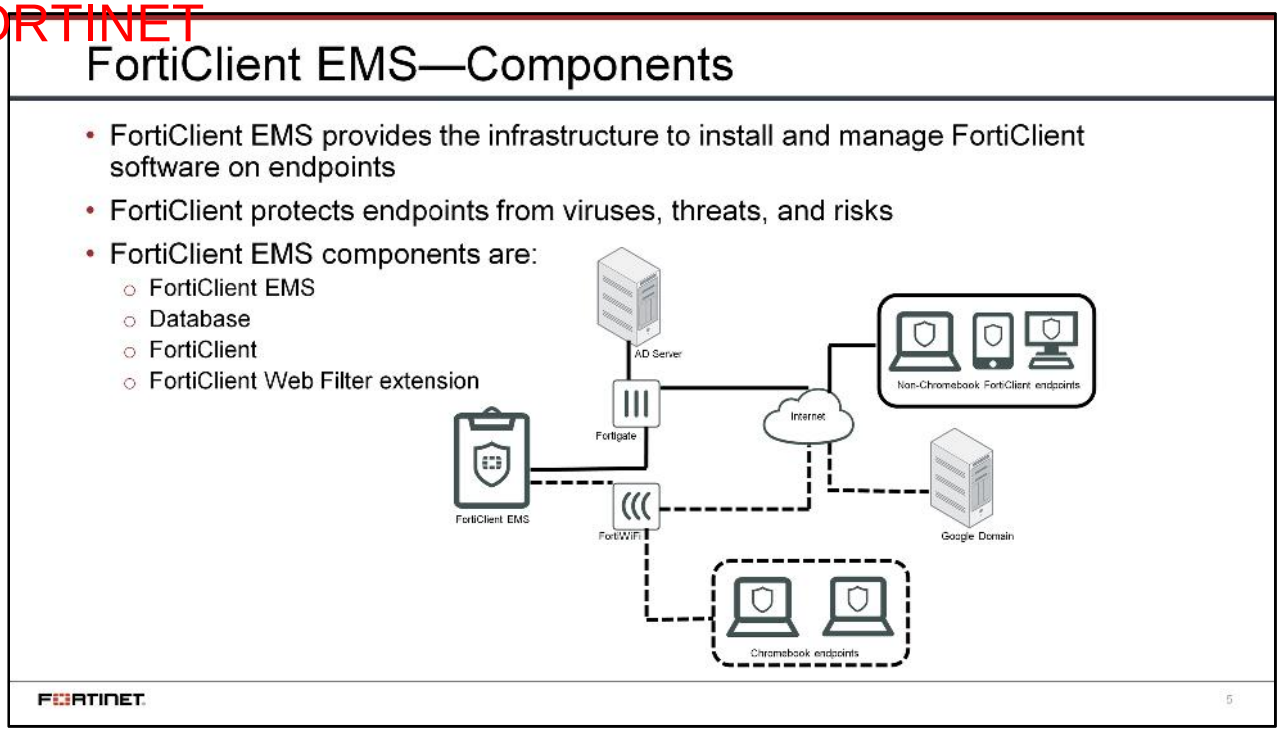
By demonstrating competence in understanding the purpose, components, and management functions of FortiClient EMS, you will be able to understand the FortiClient EMS purpose, FortiClient EMS administration and database management and identify it's components.



FortiClient EMS is a security management solution that enables scalable and centralized management of multiple endpoints (computers). It also provides efficient and effective administration of endpoints running FortiClient, and visibility across the network to securely share information and assign security profiles to endpoints. It is designed to maximize operational efficiency and includes automated capabilities for device management and troubleshooting.
FortiClient EMS also works with the FortiClient Web Filter extension to provide web filtering for Google Chromebook users.

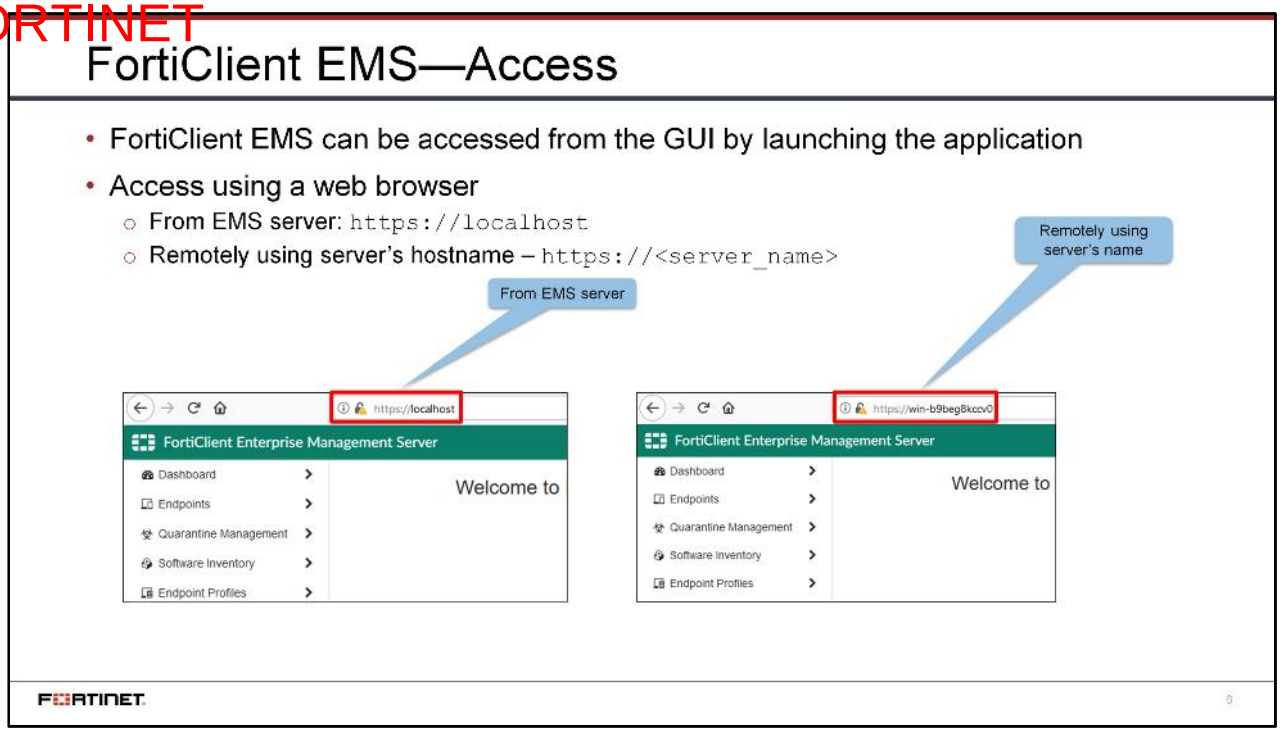
The benefits of deploying FortiClient EMS include:
- Remotely deploying FortiClient software to Windows computer
- Updating profiles for endpoint users regardless of access location
- Administering FortiClient endpoint connections, such as accepting, disconnecting, and blocking connections
- Managing and monitoring endpoints, such as status, system, and signature information
- Identifying outdated versions of FortiClient software
- Defining web filtering rules in a profile and remotely deploying the profile to the FortiClient Web Filter extension on Google Chromebook endpoints

You can manage endpoint security for Windows and macOS platforms using a unified organizational security policy. An organizational security policy provides a full, understandable view of the security policies defined in the organization. You can see all policy rules, assignments, and exceptions in a single unified view. FortiClient EMS is part of the Fortinet Endpoint Security Management suite, which ensures comprehensive policy administration and enforcement for an enterprise network.



The following components make up FortiClient EMS:

- **FortiClient EMS**: Manages FortiClient on endpoints that connect to your network. It also manages the FortiClient Web Filter extension installed on Google Chromebook endpoints, which are connected to your Google domain. It includes two types of softwares:
  - Console software that manages security profiles, FortiClient on endpoints, and Chromebook endpoints.
  - Server software that provides secure communication between endpoints and the console and between Chromebook endpoints and the Google Admin console.
- **Database**: Stores security profiles and events. Also stores user information retrieved from the Google Admin console for Chromebooks. The SQL database is installed as part of the FortiClient EMS installation.
- **FortiClient**: Helps enforce security and protection on endpoints. It runs on servers, desktops, and portable computers you want to secure.
- **FortiClient Web Filter extension**: Communicates with FortiClient EMS and enforces web filtering on Google Chromebook endpoints.



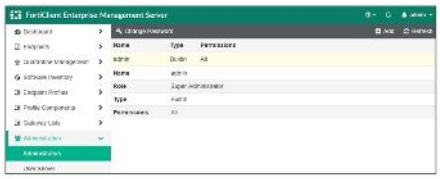
There are multiple ways to access FortiClient EMS:

- By launching the FortiClient EMS application
- By using a supported web browser instead of the GUI:
  - From the EMS server by typing `https://localhost` in the web browser
  - Remotely by using the server's hostname `https://<server_name>`

Tip: You can get the `<server_name>` by running `ipconfig /all` on the server. Your **Host Name** will appear under the Windows IP configuration. If you are unable to access the server remotely, make sure you are able to ping `<server_name>`, which can be achieved by adding it to the DNS entry or Windows host file. You may have to modify the firewall rules to allow the connection.

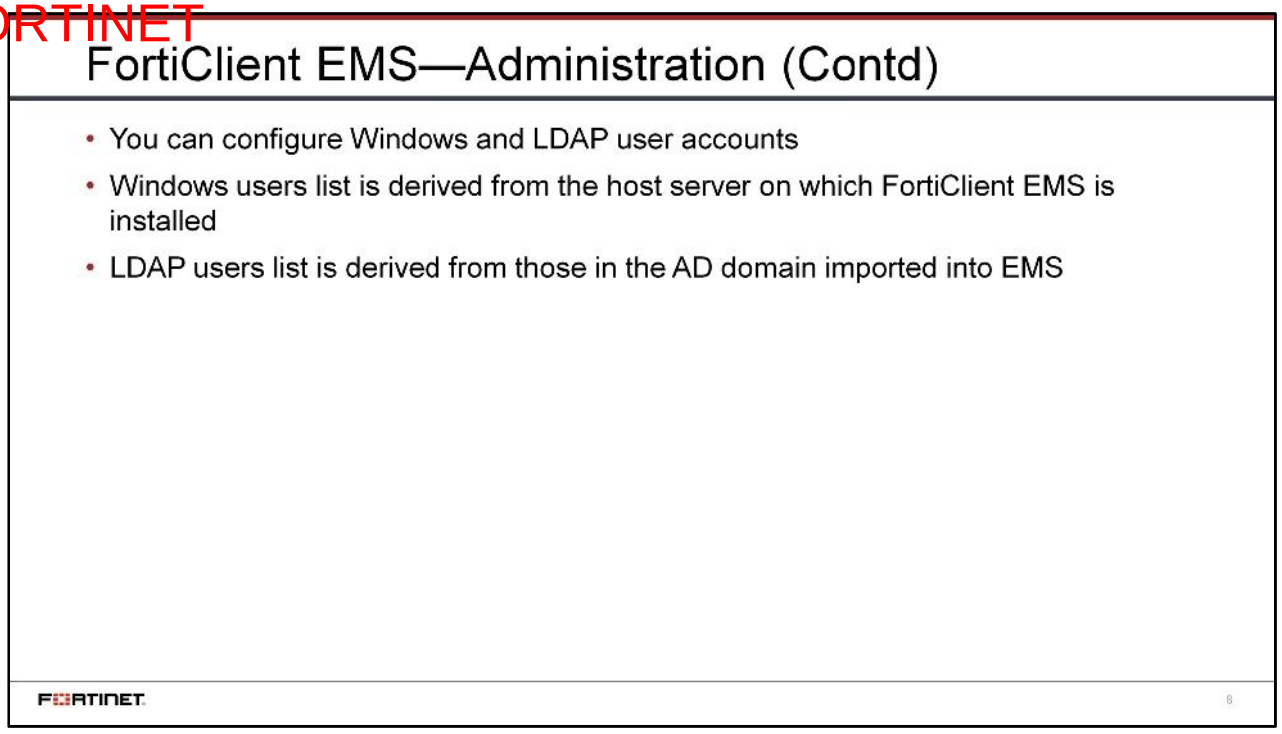
FortiClient EMS—Administration

- Default user account is admin
  - It has complete access to all FortiClient EMS permissions, including modification, user permissions, approval, discovery, and deployment
  - The admin user has access to all configured Windows and LDAP servers and users and has the authority to configure user privileges and permissions
  - By default, the admin user account has no password; you should add a password to increase security
- You can view the default admin and all users added to FortiClient EMS on
  - **Administration** > **Administrators**



FORTINET 7

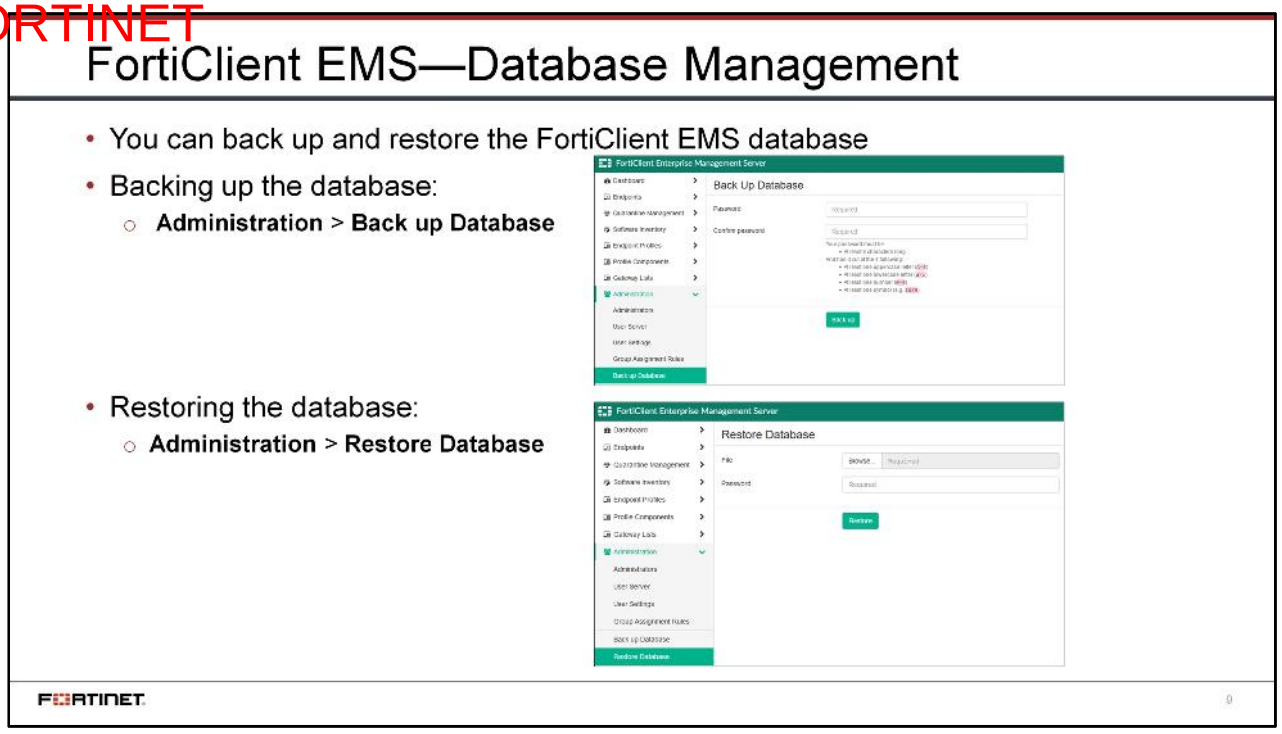
The default user named *admin* has complete access to all FortiClient EMS permissions, including modification, user permissions, approval, discovery, and deployment. The *admin* user has access to all configured Windows and LDAP servers and users and has the authority to configure user privileges and permissions. If you are not authorized for certain tasks or devices, the related menu items, items in content pages, and buttons are hidden or disabled. In addition, a message informs you that you do not have permission to view the selected information or perform the selected operation.



You can configure Windows and LDAP admin user accounts. Windows users list is derived from the host server on which FortiClient EMS is installed. The LDAP users list is derived from those in the AD domain imported into EMS.

You configure the following settings:

- **User:** Select the Windows/LDAP user to configure permissions for FortiClient EMS.
- **Super Administrator permissions:** Enable the super administrator feature to give the new Windows/LDAP user super administrator permissions.
- **Domain Access:** Select or add access to a domain for the Windows/LDAP user and configure their permissions. If you choose one or more domains in the domain access field, you must select specific permissions.
- **General Permissions:** Use the following settings to configure permissions on FortiClient EMS for the selected Windows/LDAP user
    - Create/Update/Delete LDAPs
    - Create/Update/Delete custom groups
    - Create/Delete filters
- **Endpoint Permissions:** Use the following options to configure permissions for the selected Windows user.
    - Block/Unblock/Quarantine/Unquarantine/Reregister endpoints
    - Run commands on endpoints
    - Access Software Management
    - Access CA Certificate Management
- **Policy Permissions:**
    - Assign/Unassign policies
    - Create/Update/Delete policies



Backing up the database:

1. Click **Administration** > **Back up Database**.
2. Set the following options:-
   - **Password**: Enter a password for backing up and restoring the database
   - **Confirm password**: Re-enter the password to confirm it
3. Click **Back up**.
   FortiClient EMS backs up the database

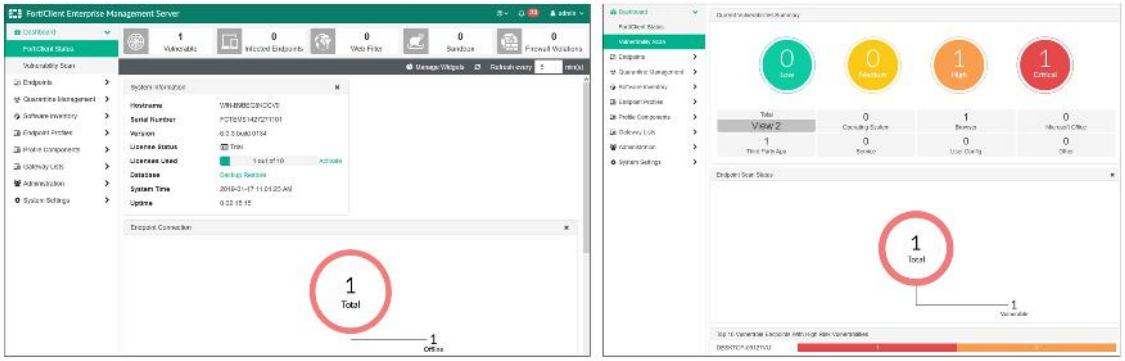
Restoring the database:

1. Click **Administration** > **Restore Database**.
2. Click **Browse**.
3. Locate the database backup file, and then click **Open**.
4. In the **Password**, enter the password used to back up the database.
5. Click **Restore**.
   When the database is restored, a message appears. The message instructs you to wait for the restored database to reload.
6. Wait for the restored database reload.

Note that restore will only work if the database was backed up using the same version number.

FortiClient EMS—Dashboard

- Shows system information, endpoints information, configuration and summary information about vulnerability scans on endpoints



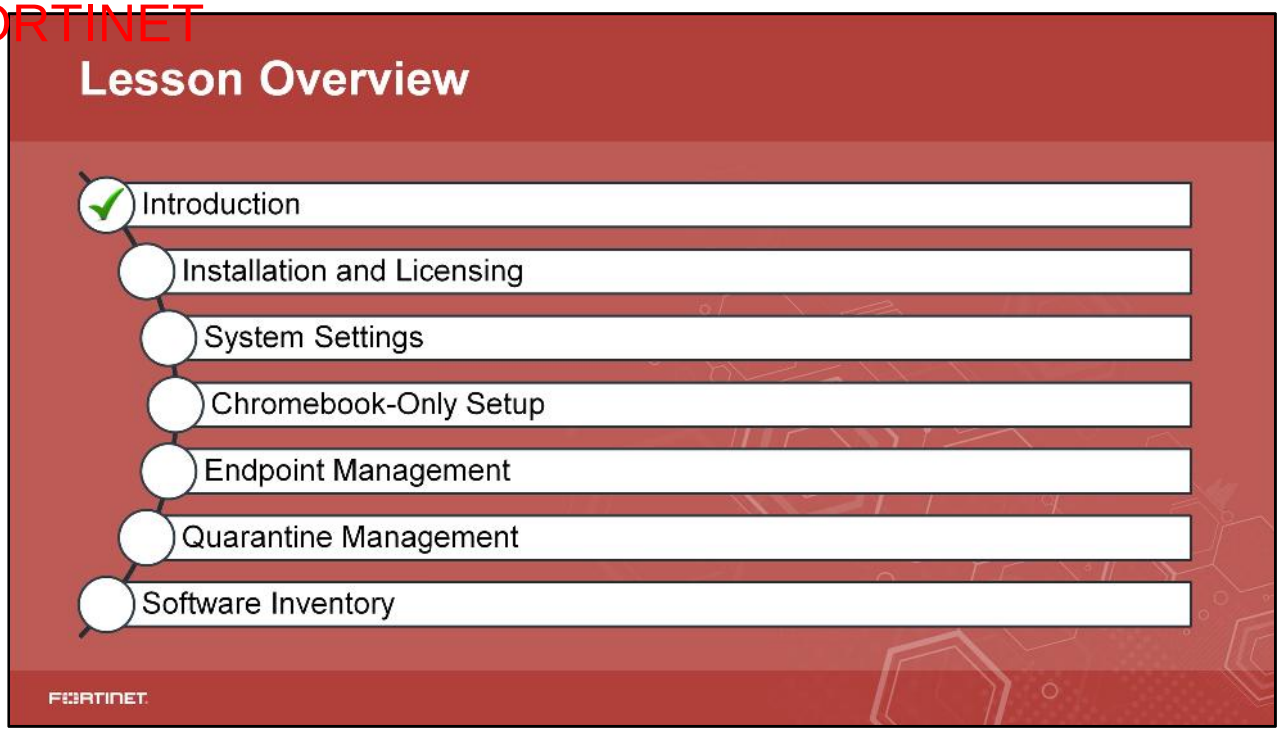
The FortiClient EMS dashboard provides a centralized summary of your system information, endpoints information, and summary information about vulnerability scans on endpoints.

You can view the following information on the dashboard:

- FortiClient Status
  - System Information widget
  - FortiClient Status charts and widgets
- Vulnerability Scan
  - Vulnerability scan charts and widgets
  - Current vulnerabilities Summary
  - Endpoint Scan Status
  - Top 10 Vulnerable Endpoints With High Risk Vulnerabilities
- Chromebook Status

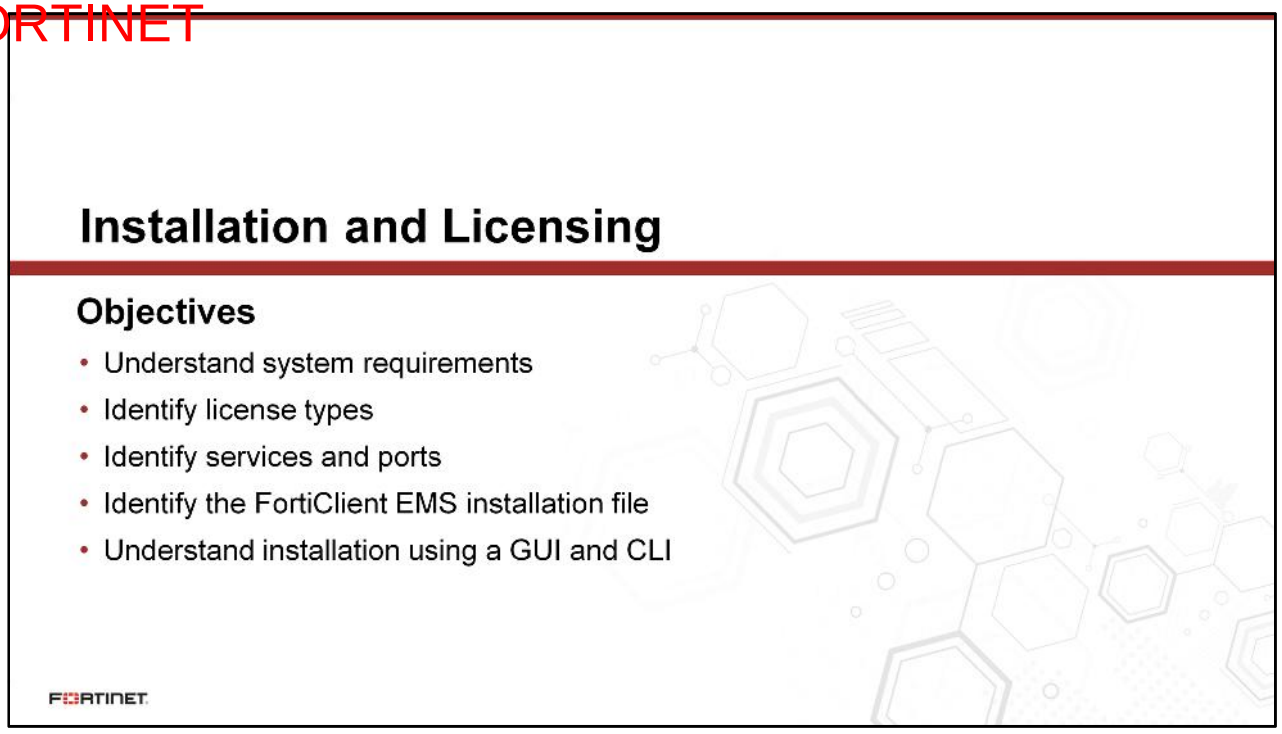
Knowledge Check

1. Which of the following are FortiClient EMS components?
   - A. FortiGate
   - ✓ B. FortiClient
2. What is the default administrator account password?
   - A. Fortinet
   - ✓ B. No-password



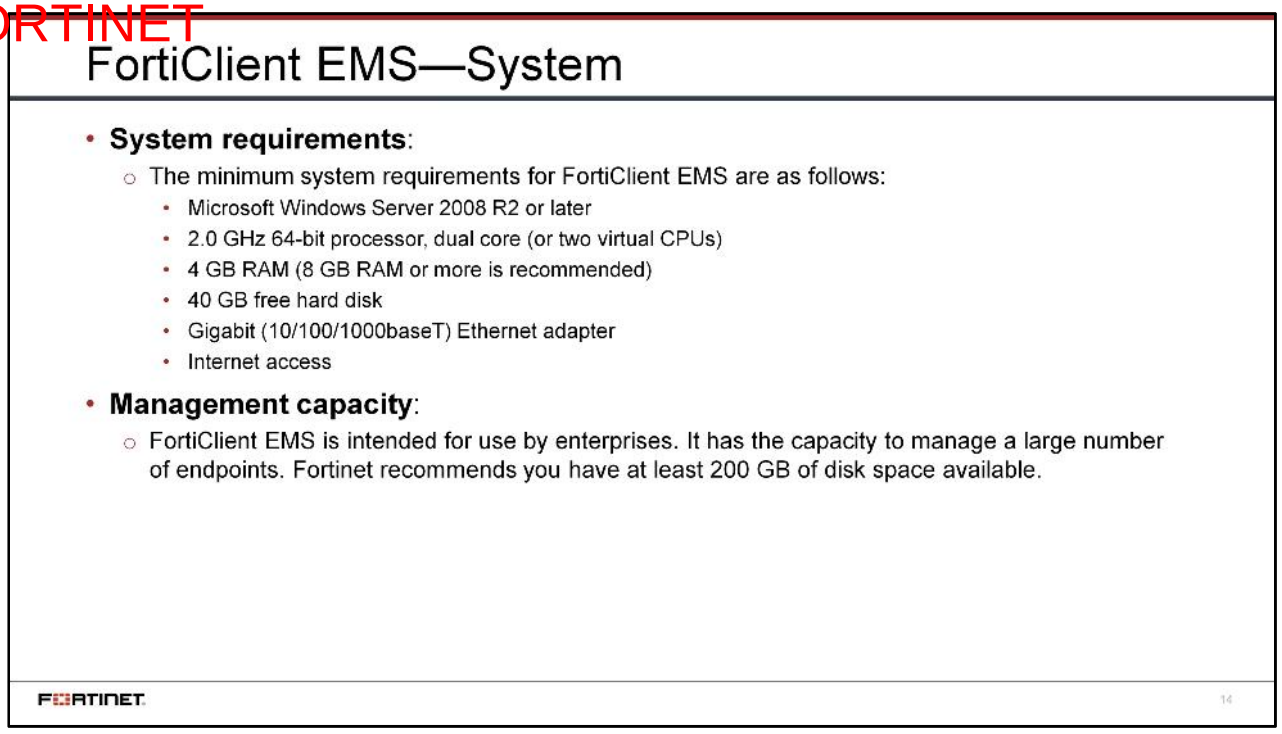
Good job! You now know why do we need FortiClient EMS in the enterprise. You also learned about FortiClient EMS components, and understand FortiClient administration and database management.

Now, you will learn about system requirements, license types, service ports, and installation options for FortiClient EMS.



After completing this section, you should be able to achieve the objectives shown on this slide.

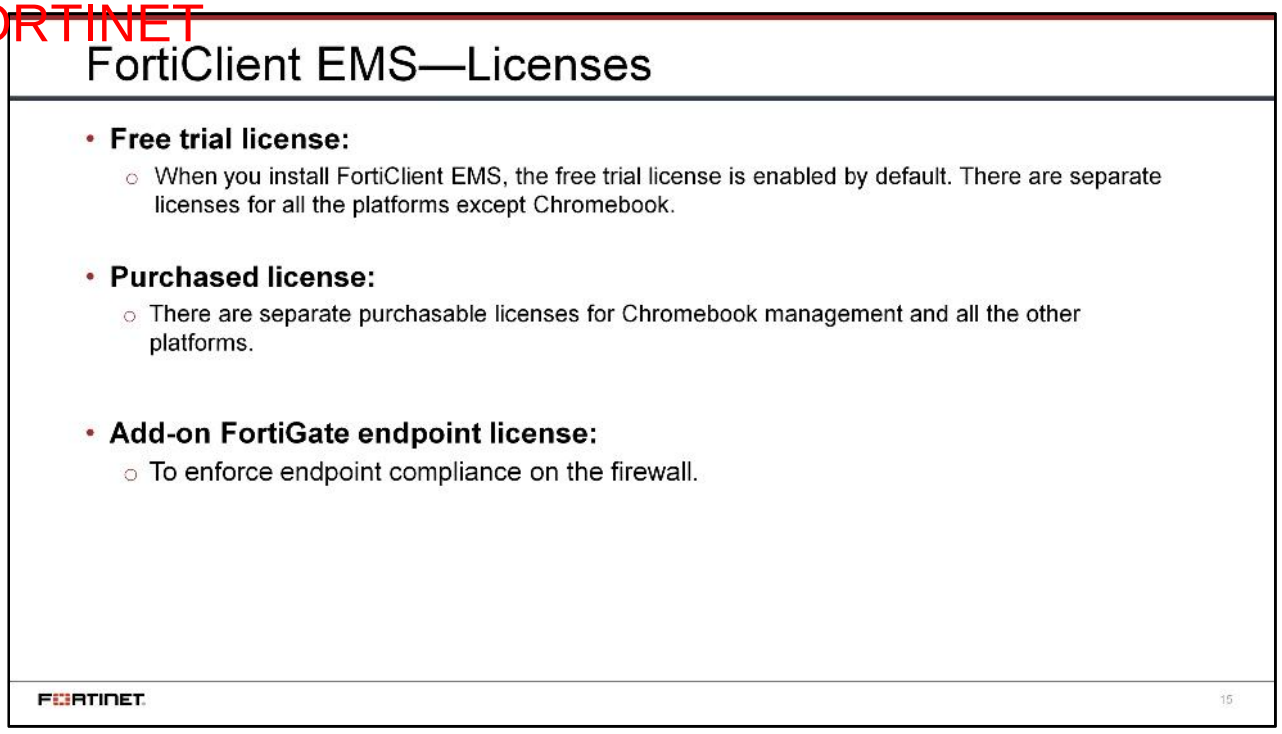
By demonstrating competence in installing and licensing FortiClient EMS, you will be able to understand system requirements, identify license types, services and ports. You will also learn about FortiClient EMS installation file and how to install using GUI and CLI.



You should read the *FortiClient EMS Release Notes* to become familiar with the relevant software components and other important information about the product.

Internet Access: Internet access is required during installation. This becomes optional once installation is complete. FortiClient EMS accesses the Internet to obtain information about FortiGuard engine and signature updates.

Note that you should only install FortiClient EMS and the default services for the operating system on the server. You should not install additional services on the same server as FortiClient EMS.



Free trial license: The free trial license for Windows, MacOS, and Linux FortiClient EMS supports ten FortiClient endpoints. FortiClient EMS consumes one license count for each managed FortiClient device. The free trial license for Chromebook management supports ten Google Chromebook users. FortiClient EMS consumes one license count for each logged-in user. If the user logs out, the license seat times out (the default timeout is 24 hours), and the license is released. At this point, another user can use this license seat.

Purchased license: Each purchased Windows, MacOS, Linux, and Google Chromebook users license allows the management of one FortiClient endpoint. You must purchase a minimum of 100 endpoint licenses, and you can have these EMS licenses for a maximum three-year term.

- **Add-on FortiGate endpoint license**: You can use a licensed FortiClient EMS to deploy, provision, and manage FortiClient endpoints. However, if you have a FortiGate in your network, you can buy an add-on FortiGate endpoint license to enforce endpoint compliance on the firewall while EMS is managing the endpoints. Using FortiGate with EMS is optional.
- **Extending license expiries**: You can apply multiple licenses to FortiClient EMS to extend the license expiry. For example, say you purchase two one-year licenses for FortiClient EMS. After you register and apply the first license, FortiClient EMS has an expiry date of September 5, 2018. You can register and apply the second license as a renewal, after which FortiClient EMS has an expiry date of September 5, 2019. You must upload the second license file to FortiClient EMS using the GUI. Registering the license does not automatically update the license expiry on FortiClient EMS. Note that using a second license to extend the license expiry date does not increase the number of clients. To increase the number of licensed clients, contact Fortinet Support for a `co-term` contract .

FortiClient EMS—Services and Ports

- You must enable the required ports and services for use by FortiClient EMS and its associated applications on your server

FortiClient EMS services and ports to manage endpoints

Communication	Usage	Protocol	Port	Incoming/Outgoing	How to customize
FortiClient Telemetry	FortiClient endpoint management	TCP	8013 (default)	Incoming	Installer/GUI
Samba (SMB) service	FortiClient EMS uses the SMB service during FortiClient initial deployment.	TCP	445	Outgoing	N/A
Distributed Computing Environment / Remote Procedure Calls (DCE- RPC)	The EMS server connects to endpoints using RPC for FortiClient initial deployment.	TCP	135	Outgoing	N/A
Active Directory server connection	Retrieving workstation and user information	TCP	389 (LDAP) or 636 (LDAPS)	Outgoing	GUI
FortiClient download	Downloading FortiClient installer created by the EMS server	TCP	10443 (default)	Incoming	Installer
Apache/HTTPS	Web access to EMS	TCP	443	Incoming	Installer
FortiGuard	FortiGuard antivirus, vulnerability, and application version updates	TCP	80	Outgoing	N/A
SMTP server/email	Alerts for EMS and endpoint events. When an alert is triggered, an email notification is sent	TCP	25 (default)	Outgoing	GUI
FortiClient endpoint probing	FortiClient EMS uses ICMP for endpoint probing during FortiClient initial deployment.	ICMP	N/A	Outgoing	N/A

FortiClient EMS services and ports to manage Chromebooks

Communication	Usage	Protocol	Port	Incoming/Outgoing	How to customize
FortiClient on Chrome OS	Connection to EMS	TCP	8443 (default) You can customize this port.	Incoming	GUI
G suite API/Google domain directory	API calls to retrieve Google domain information	TCP	443	Outgoing	N/A

The following ports and services should be enabled for use on Chromebooks when using FortiClient for Chromebooks:

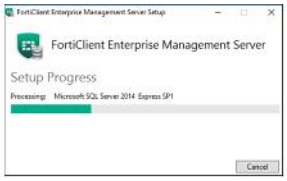
Communication	Usage	Protocol	Port	Incoming/Outgoing	How to customize
FortiClient EMS	Connection to profile server	TCP	8443 (default)	Outgoing	Via Google Admin console when adding the profile
FortiGuard	URL rating	TCP	443, 3400	Outgoing	N/A
FortiAnalyzer	Send logs to FortiAnalyzer	TCP	8443	Outgoing	N/A

FORTINET

The required ports and services enable FortiClient EMS to communicate with endpoints and servers running associated applications. You do not need to enable port 8013 and port 10443 because the FortiClient EMS installation opens these.

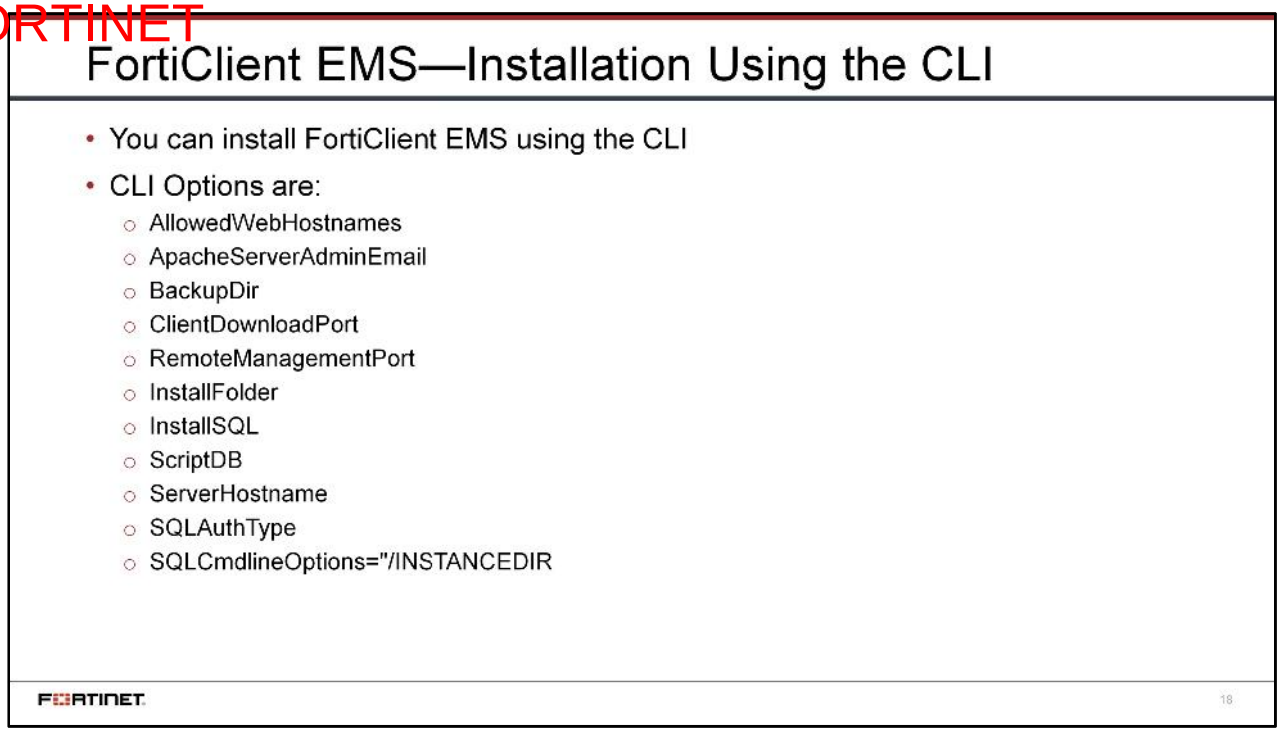
FortiClient EMS—Installation File

- Installation file is available for download from the Fortinet Support website
  - FortiClientEnterpriseManagement_6.0.X.<build>_x64.exe
- You can also receive the installation file from a sales representative
- FortiClient EMS installation package includes:
  - FortiClient EMS
  - Microsoft SQL Server 2014 Express Edition
  - Apache HTTP server



FortiClient EMS is available for download from the Fortinet Support website. You can also receive the installation file from a sales representative. The following installation file is available for FortiClient EMS: **`FortiClientEnterpriseManagement_6.0.X.<build>_x64.exe`.**

Note that local administrator rights and Internet access are required to install FortiClient EMS.



You can install FortiClient EMS using the CLI.

AllowedWebHostnames: The default value is localhost, `127.0.0.1`. To clear this value, first enter `AllowedWebHostnames=*`, then enter the desired `AllowedWebHostnames` value. Otherwise, the value entered will be appended to `[localhost, 127.0.0.1]`, so that `AllowedWebHostNames=localhost, 127.0.01, <new_value>`.

ApacheServerAdminEmail: Enter the Apache Server administrator's email address. By default, this is `admin@yourcompany.com`.

BackupDir: Enter the desired backup directory path for SQL server.

ClientDownloadPort: Enter the HTTP port number. The default is 80.

RemoteManagementPort: Enter the HTTPS port number. The default is 443.

InstallFolder: Specify the directory to install EMS to.

InstallSQL: Controls whether the installer will install SQL Server Express on the same server as FortiClient EMS. Enter `1` to install SQL Server Express; otherwise, enter `0`. By default, SQL Server Express is installed with FortiClient EMS.

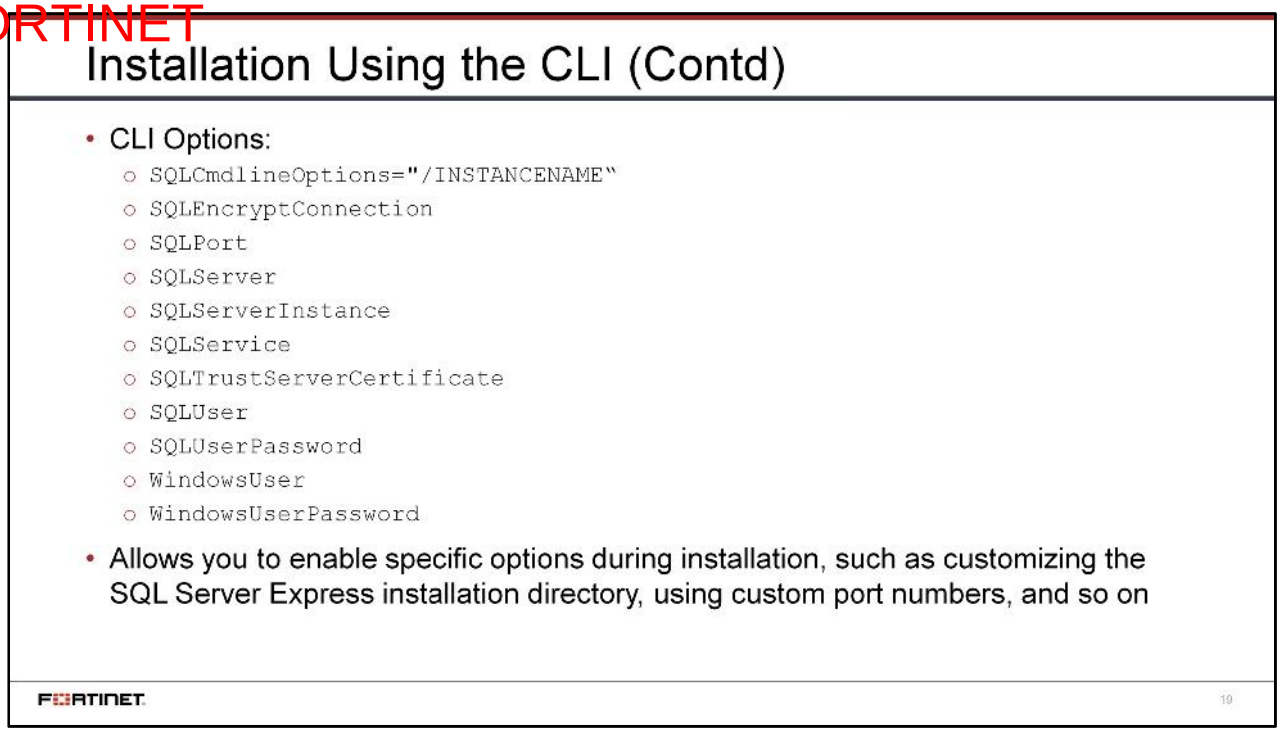
ScriptDB: Controls where the installer will attempt to create the database from db scripts. Enter `1` to create the database from db scripts. You should enter `0` only if databases have already been set up on the server and you are only installing EMS components locally.

ServerHostname: Enter the preferred hostname (the remote hostname). The default is the local host.

SQLAuthType: Enter `sql`.

SQLCmdlineOptions="/INSTANCEDIR": Enter the desired directory to install SQL Server Express to.

For details on other CLI commands, please refer to the *FortiClient EMS Administration Guide*.



Installation using the CLI allows you to enable specific options during installation, such as customizing the SQL Server Express installation directory, using custom port numbers, and so on.

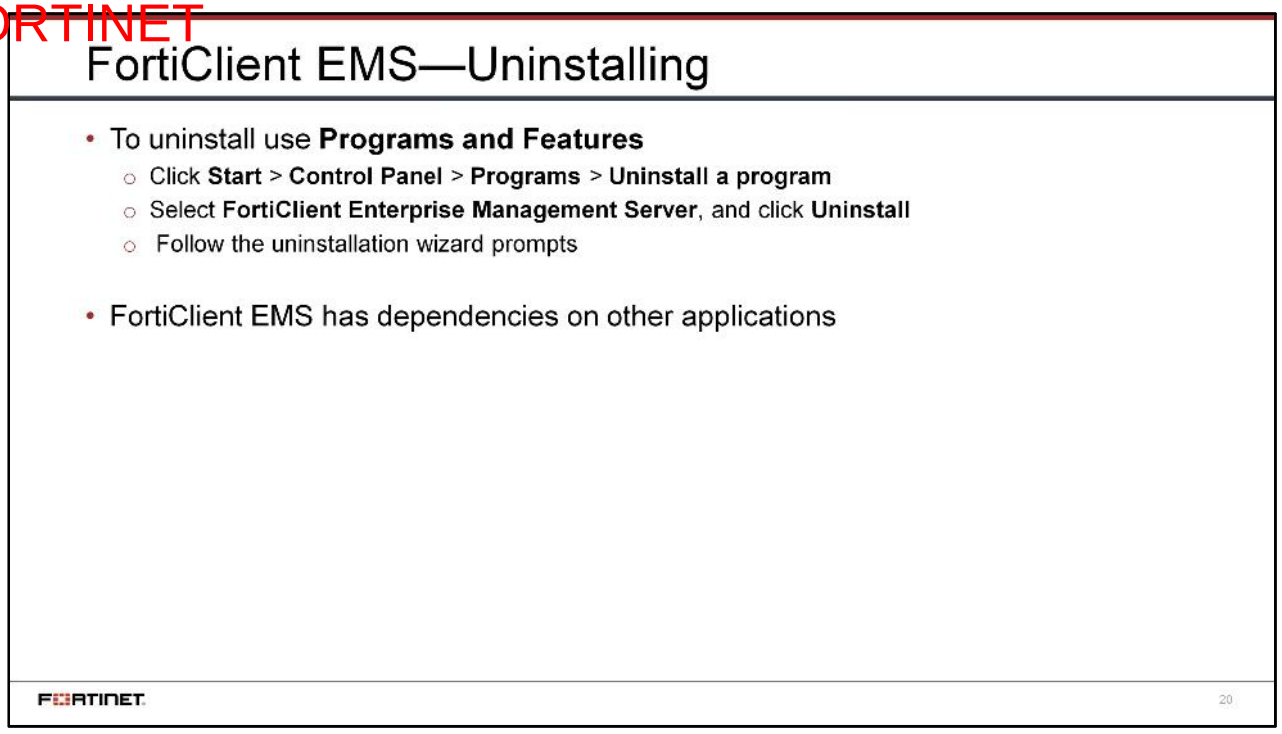
Example: Allowing remote access to FortiClient EMS and using custom port numbers.

- To allow remote access to FortiClient EMS from a web browser, install FortiClient EMS by entering the following command in the CLI. You can also specify custom HTTP and HTTPS port numbers:

```
FortiClientEnterpriseManagement_6.0.3.XXXX_x64.exe
ServerHostname =<preferred_host_name>
ClientDownloadPort = <HTTP_port_number>
RemoteManagementPort = <HTTPS_port_number>
AllowedWebHostnames = <allowed_web_host_names>
ApacheServerAdminEmail = <Apache_Server_admin_email_address>
```

- The example below specifies the server host name as `emshost.ems.com`, appends `emshost.ems.com` to the allowed web host names, and specifies `example@example.com` as the Apache server administrator email. In this example, the HTTP and HTTPS ports are changed to 1080 and 22443, respectively.

```
FortiClientEnterpriseManagement_6.0.3.XXXX_x64.exe
ServerHostname = emshost.ems.com
ClientDownloadPort = 1080
RemoteManagementPort = 22443
AllowedWebHostnames = emshost.ems.com
ApacheServerAdminEmail = example@example.com
```



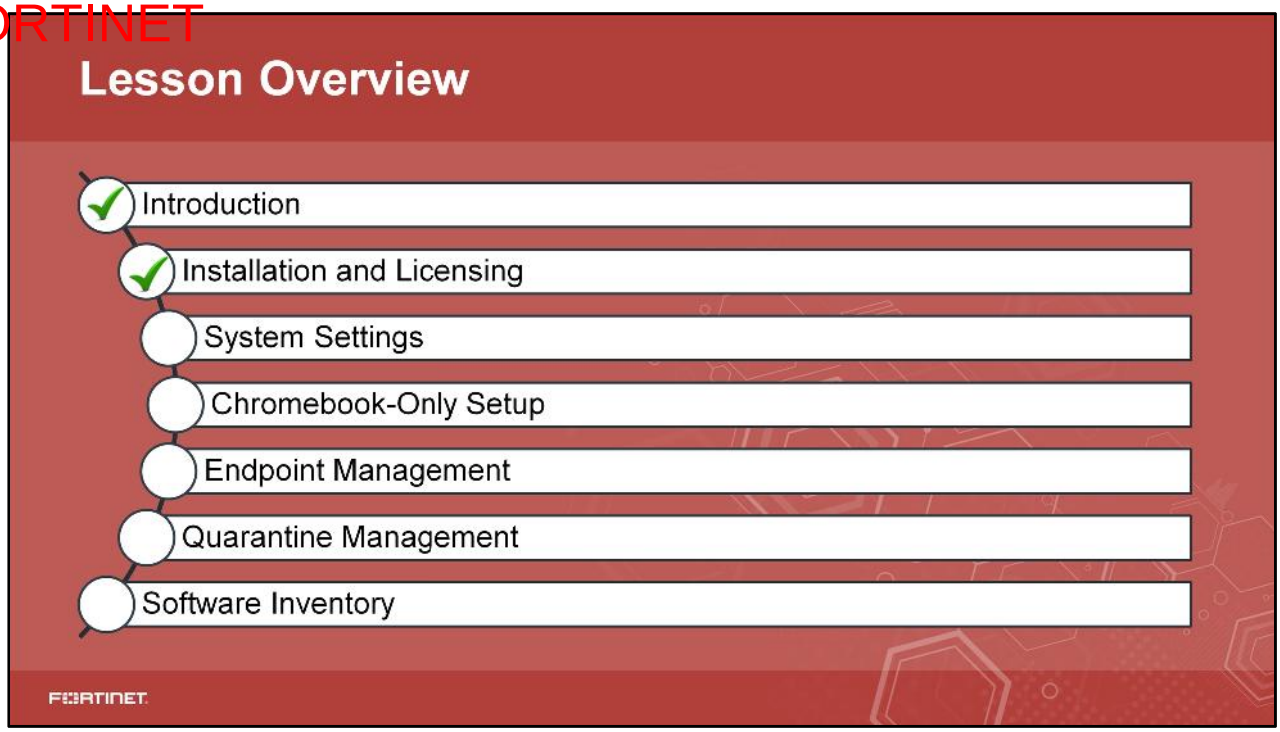
Use the **Programs and Features** pane of the Microsoft Windows Control Panel to uninstall FortiClient EMS. FortiClient EMS installs the following dependencies. If other applications on the same computer are not using them, you can uninstall them manually after removing FortiClient EMS:

- Microsoft ODBC Driver 11 for SQL Server
- Microsoft SQL Server 2008 Setup Support Files
- Microsoft SQL Server 2012 Native Client
- Microsoft SQL Server 2014 (64-bit)
- Microsoft SQL Server 2014 Setup (English)
- Microsoft SQL Server 2014 Transact-SQL ScriptDom
- Microsoft Visual C++ 2010 x64 Redistributable – 10.0
- Microsoft Visual C++ 2010 x86 Redistributable – 10.0
- Microsoft Visual C++ 2013 x86 Redistributable – 12.0
- Microsoft VSS Writer for SQL Server 2014
- SQL Server Browser for SQL S

Knowledge Check

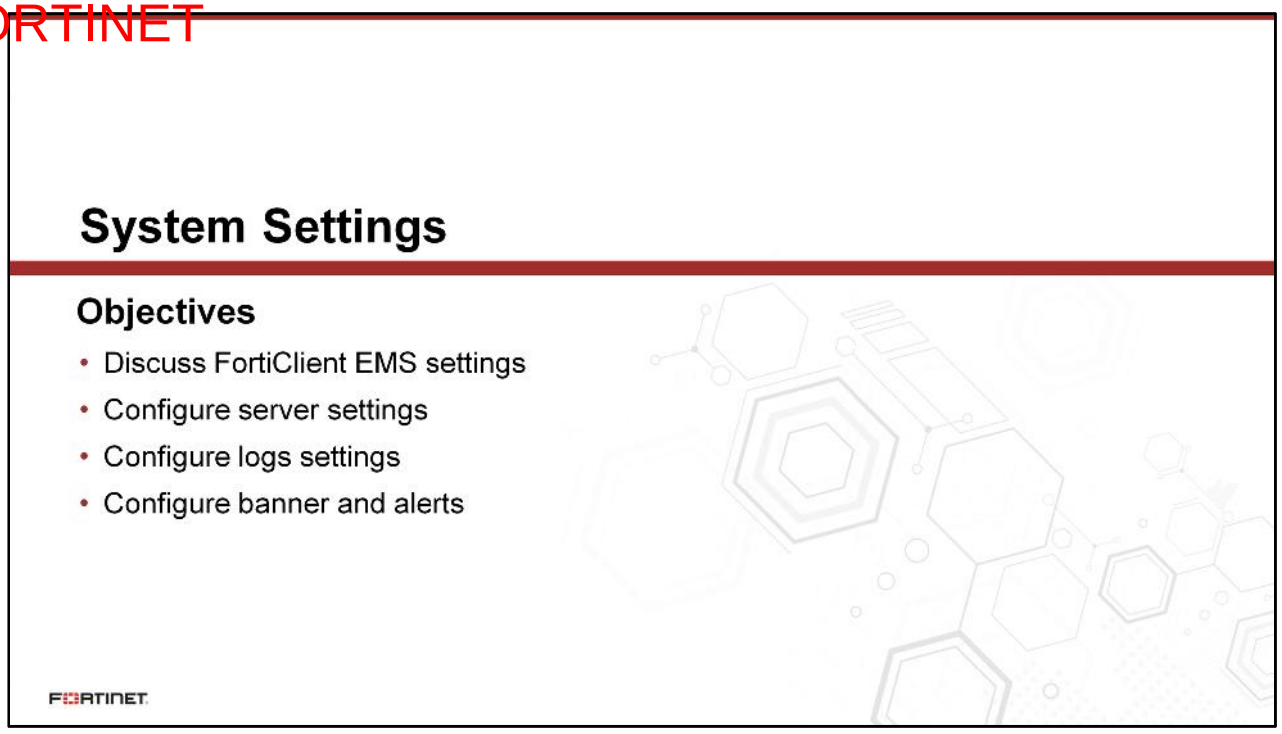
1. What minimum disk space does Fortinet require for FortiClient EMS?
   - ✓ A. 40GB
   - B. 200GB

2. Which port is used by FortiClient for Telemetry?
   - A. 10443
   - ✓ B. 8013



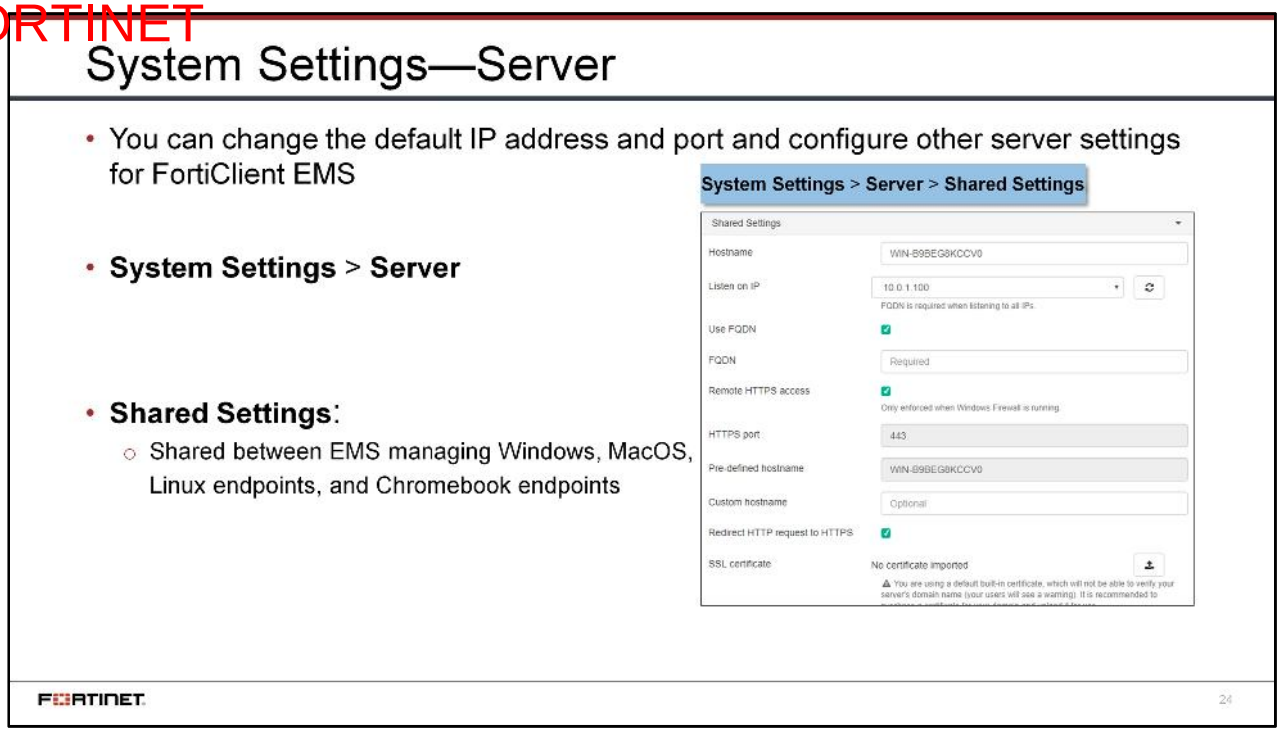
Good job! You now understand the system requirements to install FortiClient EMS. You also learned about license types, services, the FortiClient EMS installation file, as well as how to install FortiClient EMS using the GUI and CLI.

Now, you will learn about the FortiClient EMS system settings.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in FortiClient EMS system settings, you will be able to configure the following:
• Server
• Logs
• FortiGuard
• Endpoints
• Login banner
• EMS alerts
• Endpoint alerts
• SMTP server
• Custom messages

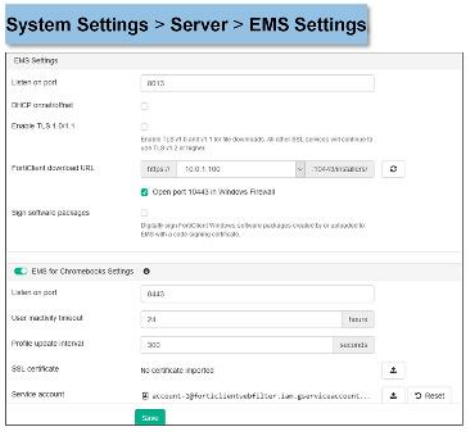


Shared Settings

- **Hostname**: Displays the FortiClient EMS server's host name.
- **Listen on IP**: Displays the IP addresses for the FortiClient EMS server. FortiClient connects to FortiClient EMS on the specified IP address
- **Use FQDN**: Turn on to specify a fully qualified domain name (FQDN) for the FortiClient EMS server.
  - **FQDN**: Displayed when **Use FQDN** is turned on. Enter the FQDN for the FortiClient EMS server. FortiClient can connect using the specified IP address in the **Listen on IP Addresses** field or the specified FQDN.
- **Remote HTTPS access**: Specify settings for remote administration access to FortiClient EMS. Turn remote HTTPS access to FortiClient EMS console on and off. The following options are available when you select the **Remote HTTPS access** check box:
  - **Pre-defined hostname**:. Displays the pre-defined host name. You cannot change the name.
  - **Custom hostname**: Displays the pre-defined host name of the server on which FortiClient EMS is installed. You can customize the host name. When you change the host name, the web server restarts.
  - **Redirect HTTP request to HTTPS**: If you select this check box and you attempt to remotely access EMS at `http://`<server_name>, this URL is automatically redirected to `https://<server_name>`.
- **SSL certificate**: Displays the SSL certificate currently imported. If you have already uploaded an SSL certificate, the page displays the **Replace** button.

System Settings—Server

- **EMS Settings**:
  - These settings are used by FortiClient EMS managing Windows, MacOS, and Linux endpoints
- **EMS for Chromebooks Settings**
  - These settings are used by FortiClient EMS managing Chromebook endpoints



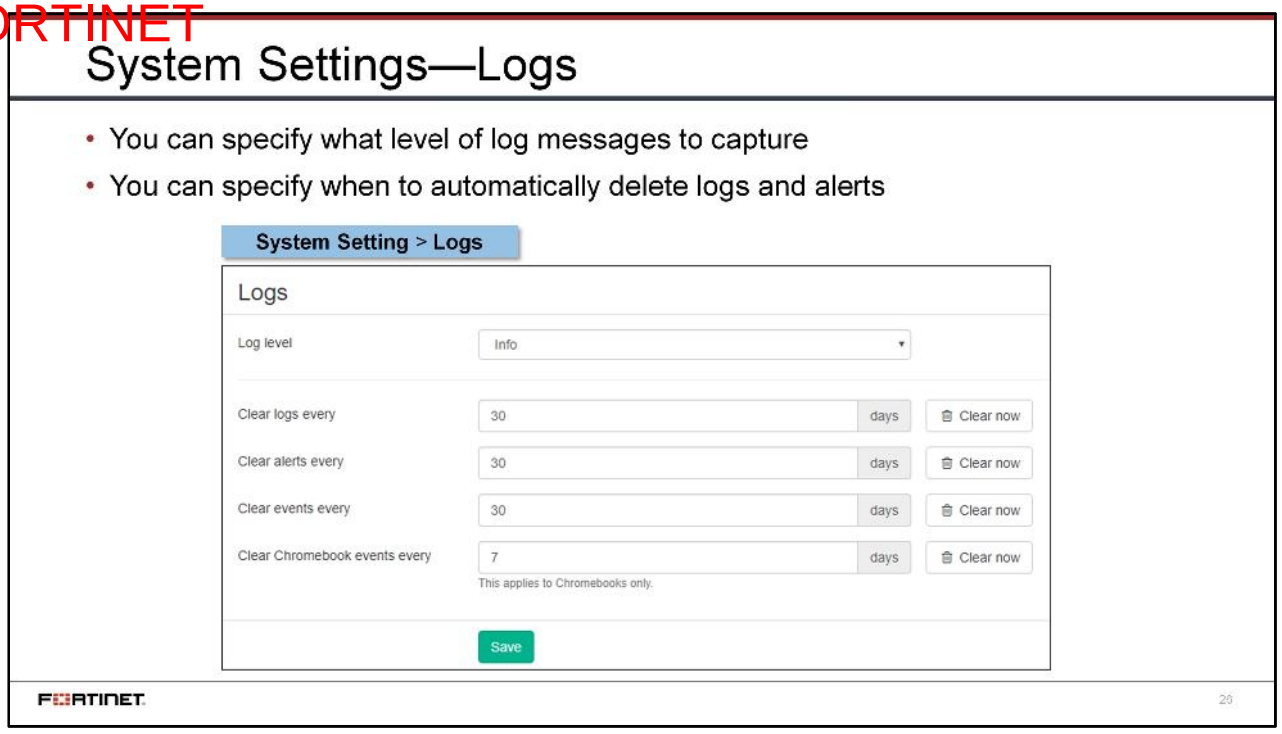
FORTINET 25

EMS Settings

- **Listen on port**: Displays the default port for the FortiClient EMS server. You can change the port by typing a new port number. FortiClient connects using the specified port.
- **DHCP onnet/offnet**: Enable to monitor endpoints within the company network (on-net). Endpoints that are connected to FortiClient EMS from outside the company network are off-net endpoints.
- **Enable TLS 1.0/1.1**: Enable TLS 1.0 and 1.1 for file downloads. Windows 7 uses old TLS versions.
- **FortiClient download URL**: FortiClient installers created on FortiClient EMS will be made available for download at the URL.
- **Sign software packages**: Select this checkbox to have Windows FortiClient software installers created by or uploaded to EMS digitally signed with a code signing certificate.

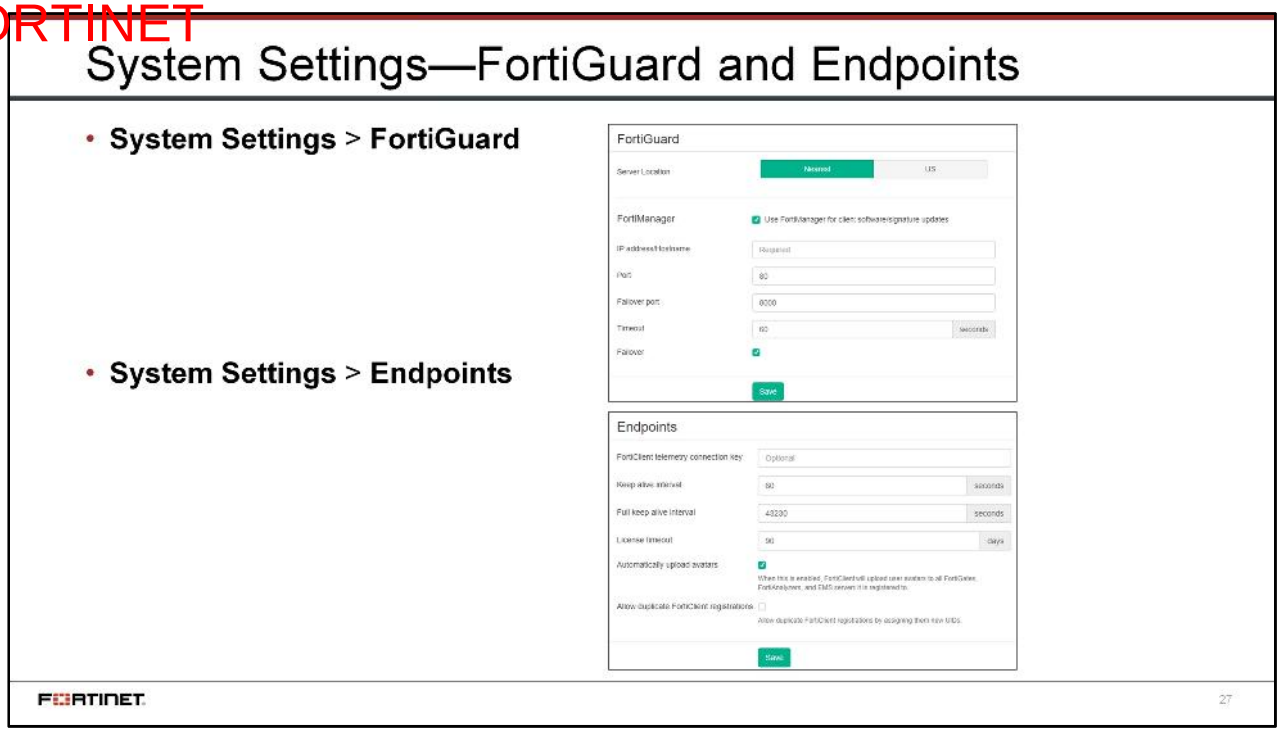
EMS for Chromebooks Settings

- **Listen on port**: Displays the default port for the FortiClient EMS server for Chromebooks. You can change the port by typing a new port number. The FortiClient Web Filter extension on Chromebooks connects to FortiClient EMS using the specified port number.
- **User inactivity timeout**: Enter the number of hours of inactivity after which to time out the user.
- **Profile update interval**: Specify the profile update interval (in seconds).
- **SSL certificate**: Displays the SSL certificate currently imported. If you have already uploaded an SSL certificate, the page displays **Replace** button.
- **Certificate:** Browse and upload a new SSL certificate file.
- **Password**: Configure a new SSL password.
- **Service account**: Displays the service account ID currently in use. You must enter an account ID and Private key to update account. Note that you must add an SSL certificate to FortiClient EMS to allow Chromebooks to connect to EMS.



In **System Settings**>**Logs** you can specify what level of log messages to capture in the logs for FortiClient EMS. You can also specify when to automatically delete logs and alerts.

- **Log level**: Select the level of messages to include in FortiClient EMS logs. For example, if you select **Info**, all log messages from **Info** to **Emergency** are added to the FortiClient EMS logs.
- **Clear logs every**: Enter the number of days that you want to store logs. For example, if you enter `30`, logs will be stored for `30` days. Any logs older than `30` days are automatically deleted.
- **Clear alerts every**: Enter the number of days that you want to keep alerts. For example, if you enter `30`, alerts will be kept for `30` days. Any alerts older than `30` days are automatically deleted.
- **Clear events every**: Enter the number of days that you want to keep events. For example, if you enter `30`, events will be kept for `30` days. Any events older than `30` days are automatically deleted.
- **Clear Chromebook events every**: Enter the number of days that you want to keep Chromebook events. For example, if you enter `30`, Chromebook events will be kept for `30` days. Any Chromebook events older than `30` days are automatically deleted.
- **Clear now**: Click to immediately delete all FortiClient EMS logs or alerts.

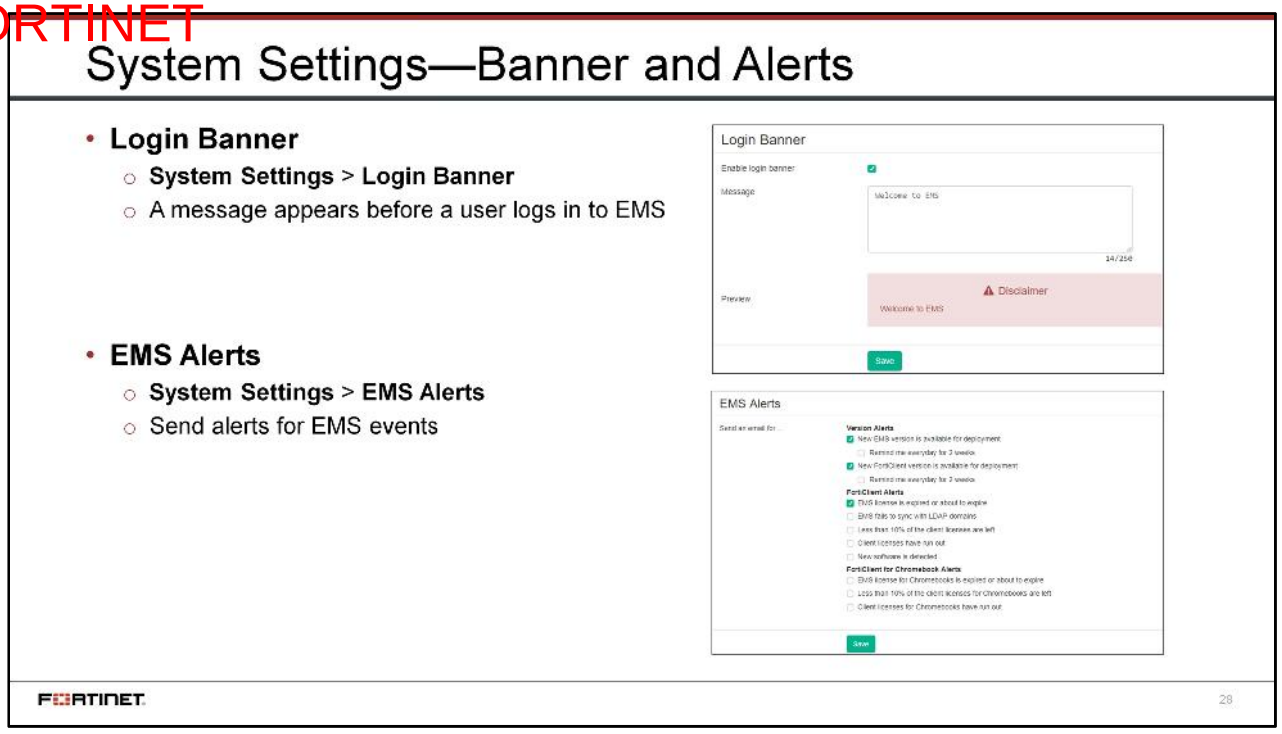


FortiGuard

- **Server Location**: Configure FortiGuard server location to **Nearest** or **US**.
  - If you select **Nearest**, FortiClient EMS connects to the FortiGuard server whose IP address is provided by the DNS server.
  - If you select **US**, FortiClient EMS can connect only to FortiGuard servers available in the United States and does not attempt to access a FortiGuard server outside the U.S.
- **FortiManager**: Use FortiManager for client software/signature updates. The **Failover** enables failover to FDN when FortiManager for FortiClient is not available.

Endpoints

- **FortiClient telemetry connection key**: Add the FortiClient telemetry connection key for FortiClient EMS. FortiClient must provide this key during connection.
- **Keep alive interval**: Each connected FortiClient endpoint sends a short keep-alive message to FortiClient EMS at the specified interval.
- **Full keep alive interval**: Each connected FortiClient endpoint sends a full keep-alive message to FortiClient EMS at the specified interval.
- **License timeout**: Each connected FortiClient endpoint consumes a license seat
  - If an endpoint disconnects from EMS, the license seat is retained in anticipation that the endpoint will reconnect. If the endpoint does not reconnect within the given time out, its connection record is removed from EMS.
  - If the endpoint is removed, switched off, or goes offline, and does not re-establish a telemetry connection to EMS within the given time out, the endpoint is deleted from EMS even if FortiClient on the endpoint shows that it is still connected.
- **Automatically upload avatars**: If you select this check box, FortiClient uploads user avatars to all of the devices
- **Allow duplicate FCT registrations**: If you select this check box, this setting allows duplicate FortiClient registrations by assigning the duplicate registrations new UIDs.

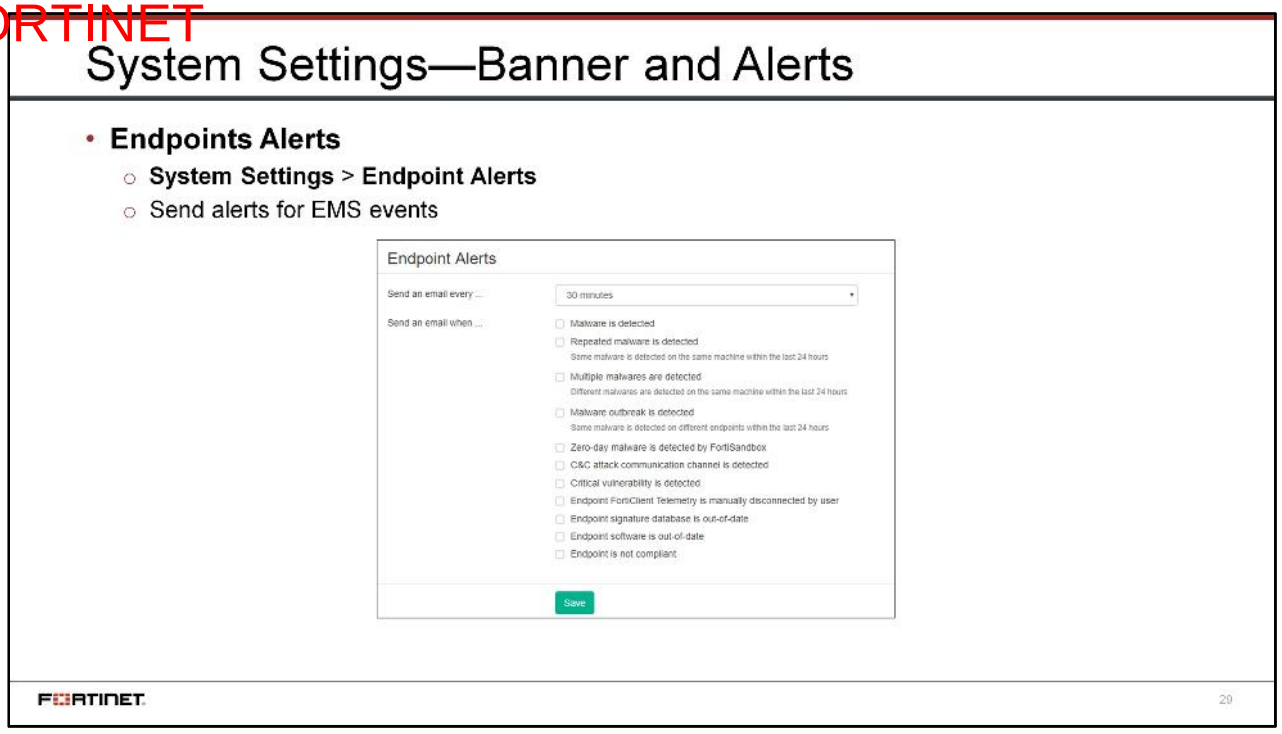


When you select the **Enable login banner** check box, a message appears on the login screen before a user logs in to EMS.

1. Click **System Settings** > **Login Banner.**
2. Click. **Enable login banner.**
3. In the **Message** field, type your message.
   The **Preview** section displays a preview of the message.
4. Click **Save.**

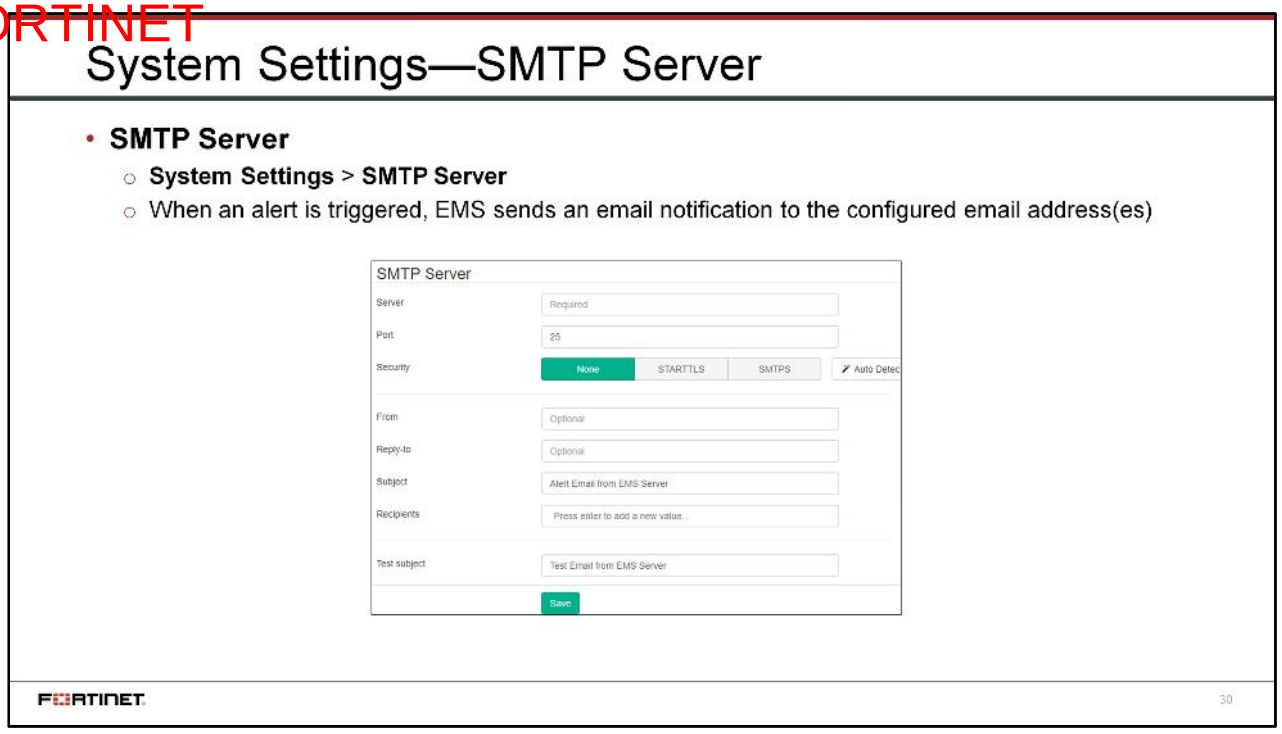
EMS Alerts:

- **Version Alerts**
  - New EMS version is available for deployment
  - New FortiClient version is available for deployment
- **FortiClient Alerts**
  - EMS license is expired or about to expire
  - EMS fails to sync with LDAP domains
  - Less than 10% of client licenses are left
  - Client licenses have run out
  - New software is detected
- **FortiClient for Chromebook Alerts**
  - EMS license for Chromebooks is expired or about to expire
  - Less than 10% of the client licenses for Chromebooks are left
  - Client licenses for Chromebooks have run out



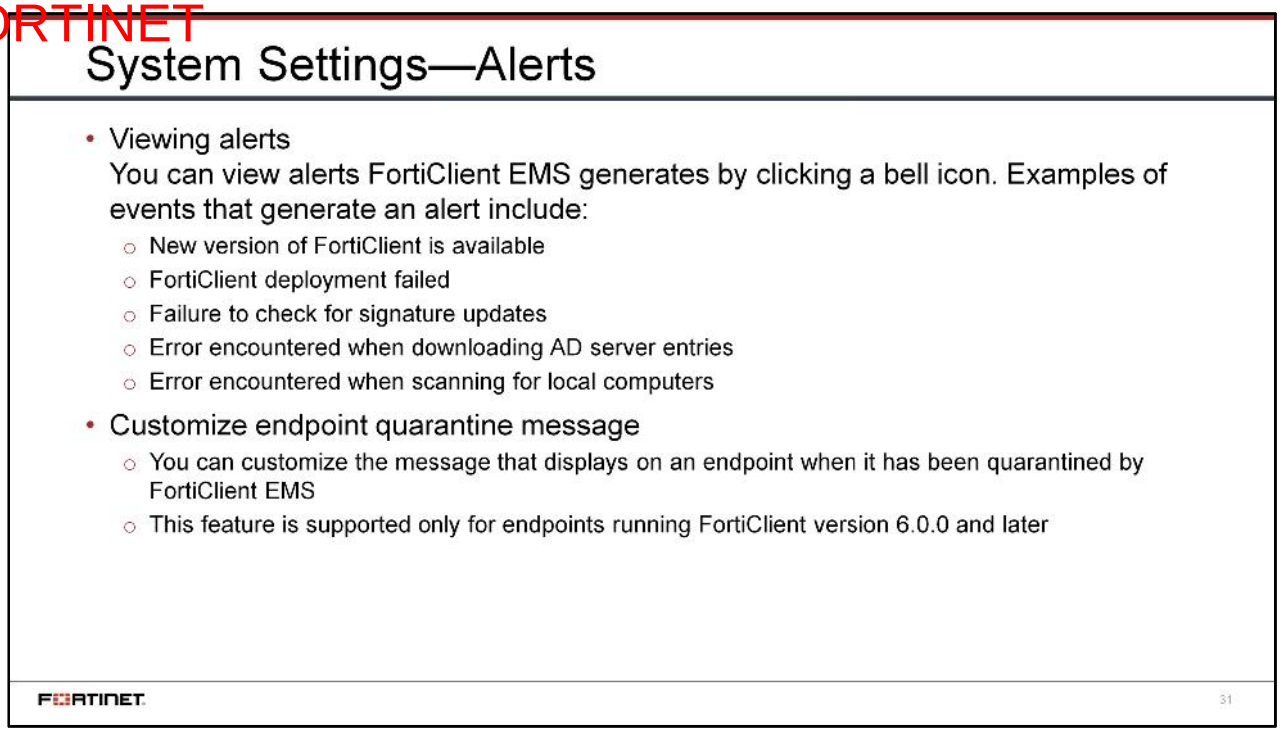
Endpoints Alerts:

- **System Settings** > **Endpoint Alerts**
- Select the following events to send email for:
  - **Malware is detected**
  - **Repeated malware is detected (same malware is detected on the same machine within the last 24 hours)**
  - **Multiple malwares are detected (different malwares are detected on the same machine within the last 24 hours)**
  - **Malware outbreak is detected (same malware is detected on different endpoints within the last 24 hours)**
  - **Zero-day malware is detected by FortiSandbox**
  - **C&C attack communication channel is detected**
  - **Critical vulnerability is detected**
  - **Endpoint FortiClient Telemetry is manually disconnected by user**
  - **Endpoint signature database is out-of-date**
  - **Endpoint software is out-of-date**
  - **Endpoint is not compliant**



SMTP Server:

- **System Settings** > **SMTP Server**
- You can set up an SMTP server to enable alerts for EMS and endpoint events
  - **Server**: Enter the SMTP server.
  - **Port**: Enter the port number.
  - **Security**: Select **None**, **STARTTLS**, or **SMTPS** for the security type, or select the **Auto Detect** button to automatically select the security type. If you select **STARTTLS** or **SMTPS**, the **Username** and **Password** boxes become available.
  - **From**: Enter the email address to send the alerts from.
  - **Reply-To**: Enter the email address to send the replies to.
  - **Subject**: The subject of the sent email alert.
  - **Recipients**: Enter email address(es) to send alerts to. Press **Enter** to add more email addresses.
  - **Test subject**: Test email's subject.
  - **Test message**: Test email's message.
  - **Test recipient**: Email address to send the test email to.
  - **Send Test Email**: Click the button to test the configured email settings.



Viewing Alerts:

- You can view the alerts FortiClient EMS generates. Examples of events that generate an alert include:
  - New version of FortiClient is available
  - FortiClient deployment failed
  - Failure to check for signature updates

- A red label is associated with the **Alert** icon when new notifications are available or received. It is cleared when you view the alert.
  - Click the **Alert** icon (a bell) in the toolbar.
  - Click the **Filter** icon in each column heading to apply filters.
  - Click **Clear Filters** to remove the filters

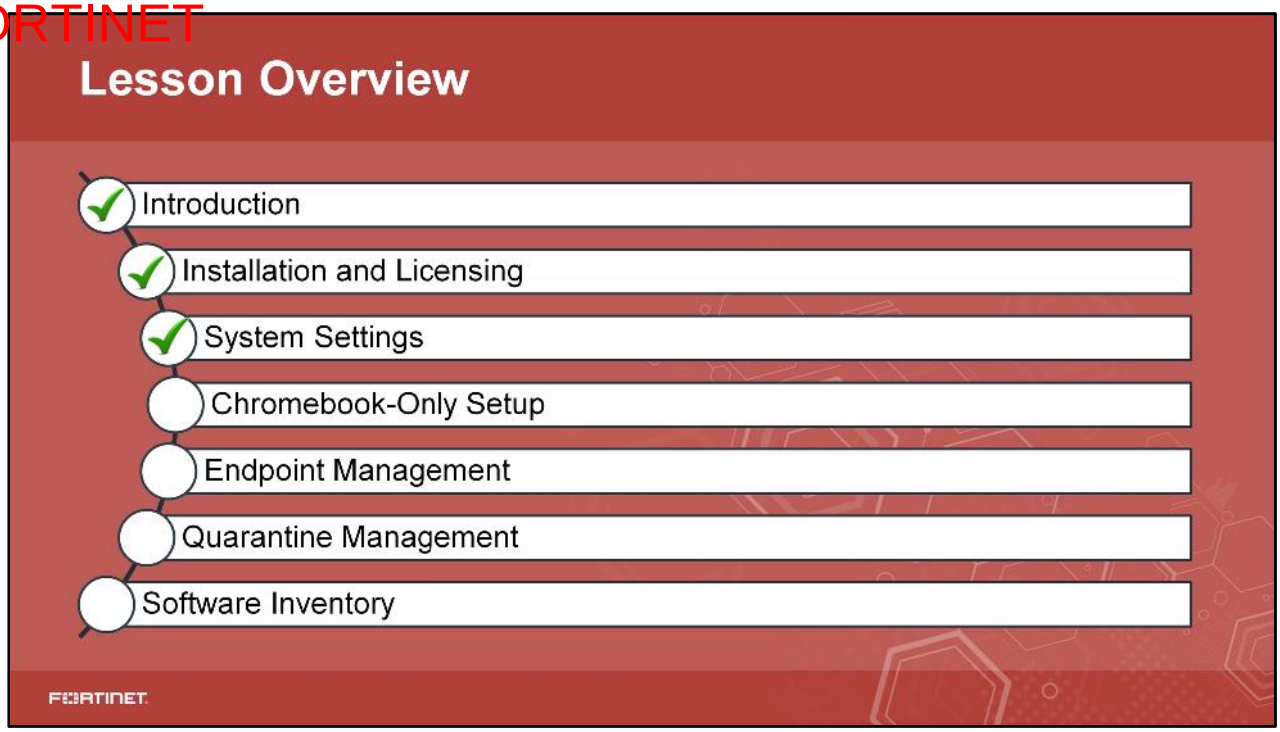
- Customize endpoint quarantine message
  1. Click **System Settings** > **Custom Messages**.
  2. Select **Endpoint Quarantine Message**.
  3. In the **Message** field, enter the desired message. You can enter up to 512 characters. The **Preview** section displays the custom message as it would appear on the latest version of FortiClient. You can also use the **Preview** slider to zoom in and out on the message preview.

Knowledge Check

1. By default, which port does FortiClient EMS managing a Chromebook endpoint listen on?
   - ✓ A. 8443
   - B. 8013

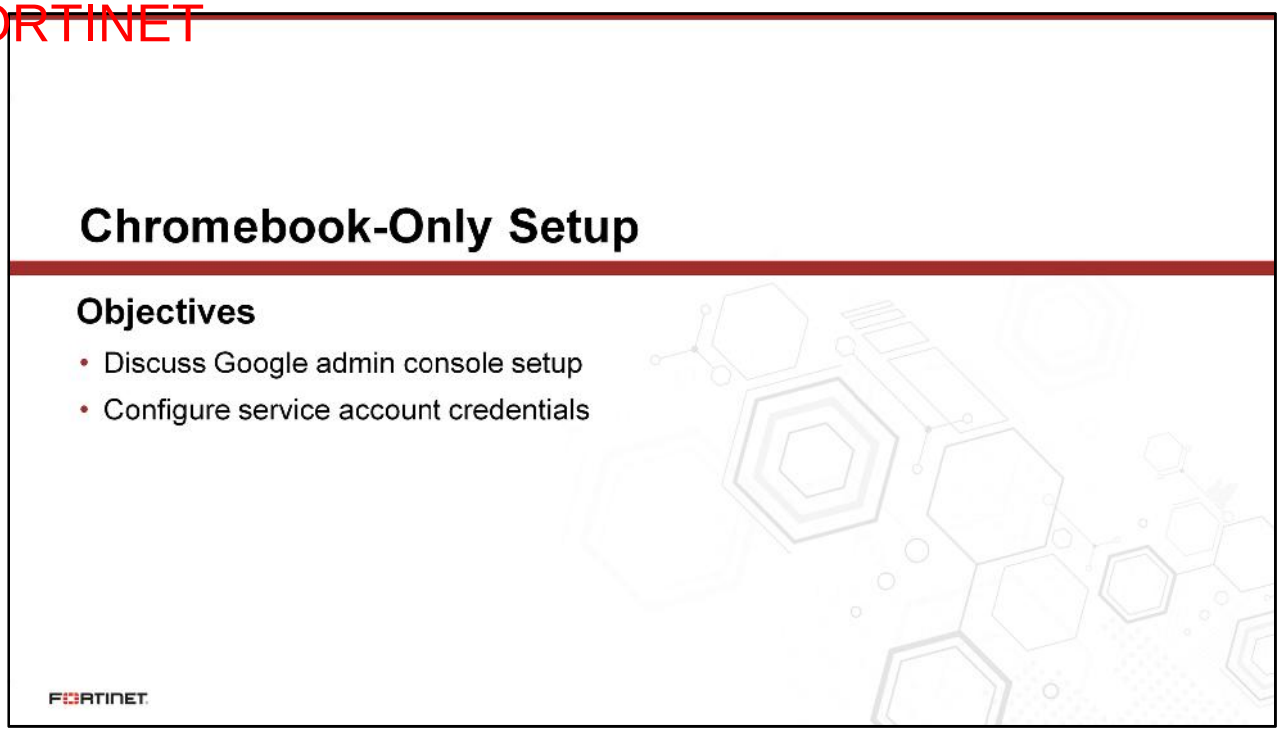
2. Which of the following are FortiGuard server locations?
   - A. US or EMEA
   - ✓ B. US or Nearest

FORTINET 32



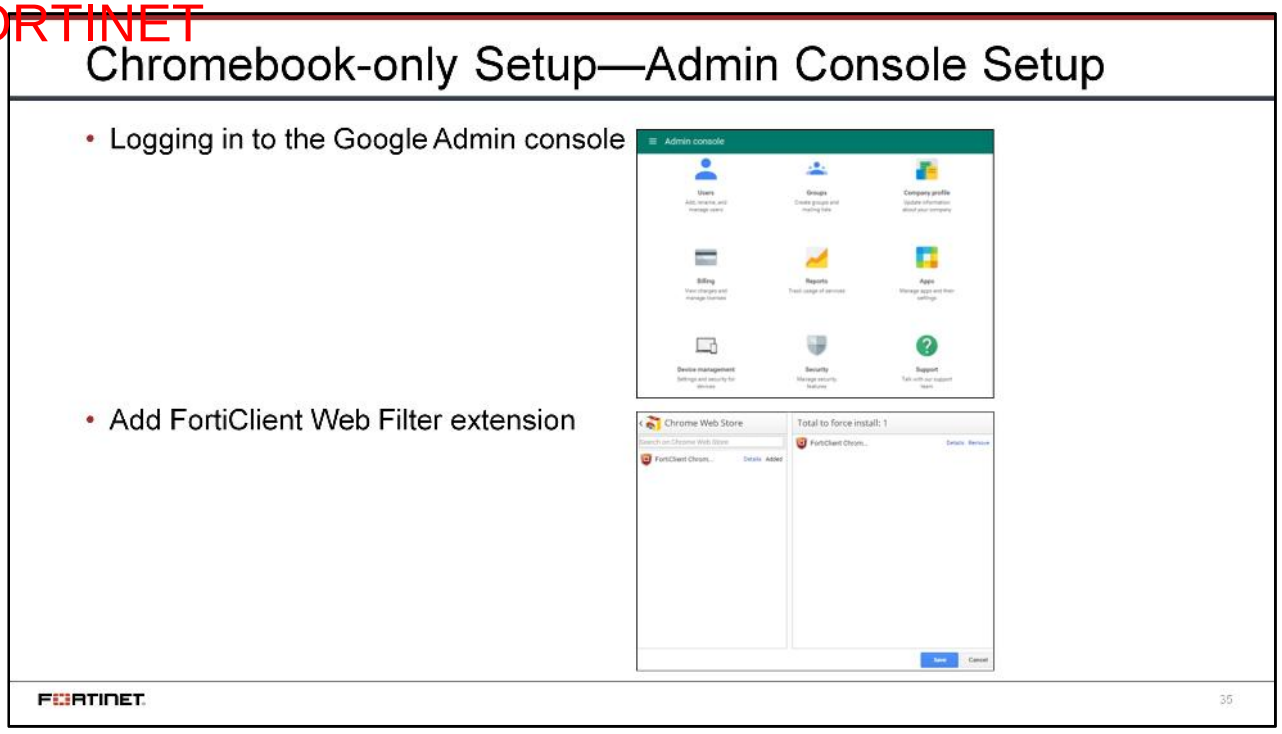
Good job! You now understand the system settings for FortiClient EMS.

Now, you will learn how to set up FortiClient EMS for Chromebook only.



After completing this section, you should be able to achieve the objectives shown on this slide.

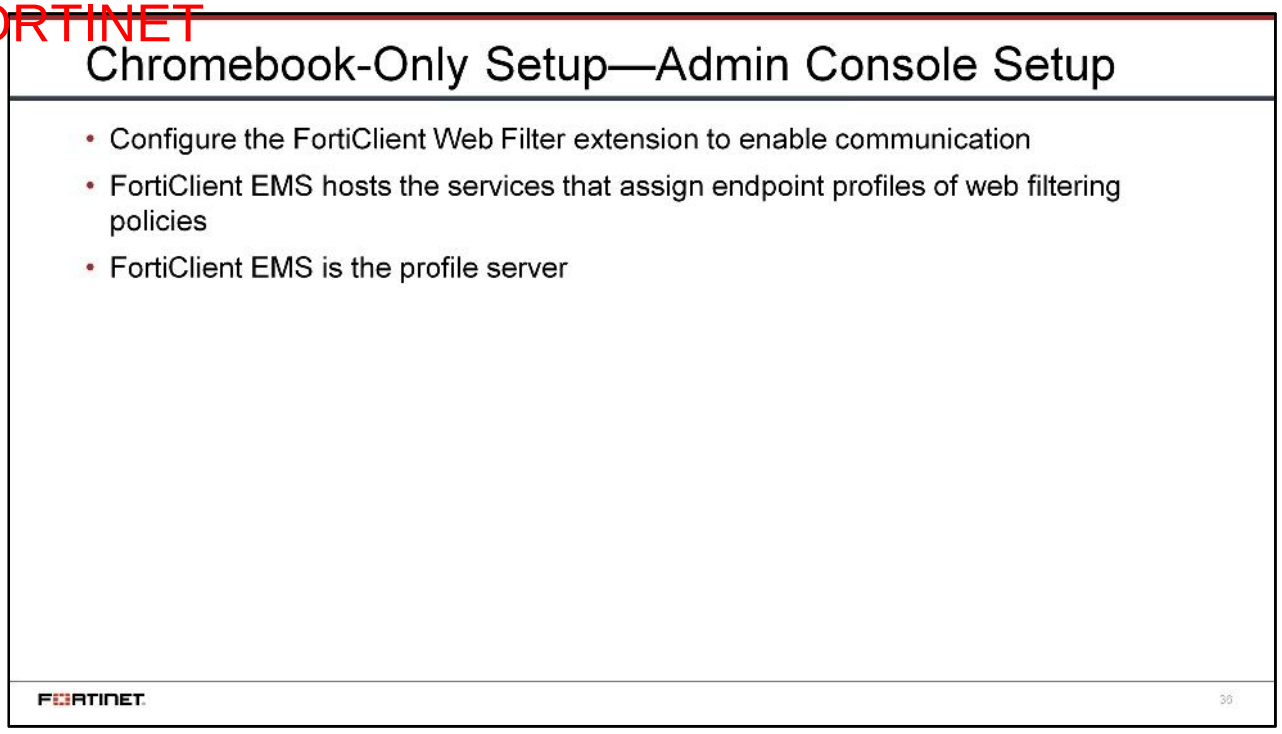
By demonstrating competence in setting up FortiClient EMS to manage Chromebooks, you will be able to configure the Google admin console setup and service account credentials.



Log in to the Google admin console using your Google domain admin or G Suite account.
Note that a Google account set up through an organization like work, school, a club, or maybe family or friends, is called G Suite account.

Adding the FortiClient Web Filter extension:

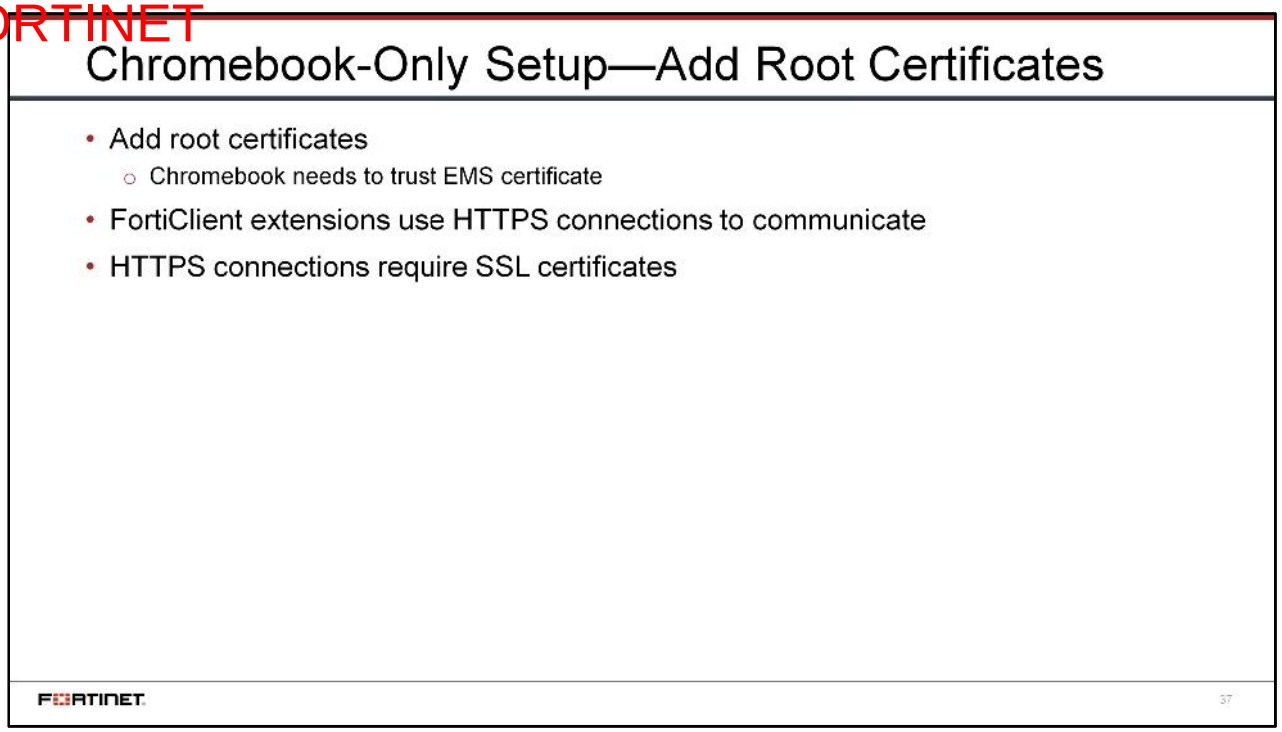
1. On the Google Admin console, click **Device management** > **Chrome Management** > **User Settings** > **Apps and Extensions** > **Force-installed Apps and Extensions** > **Manage force-installed apps**.
2. Select **Chrome Web Store**, and search for the following extension ID:
   `igbgpehnbmhgdgjbhkkpedommgmfbeao`
3. Add the extension ID, and then click **Save**.
   The extension name displays as **FortiClient Chromebook Web Filter Extension**.



You must configure the FortiClient Chromebook Web Filter extension to enable the Google Admin console to communicate with FortiClient EMS. FortiClient EMS hosts the services that assign endpoint profiles of web filtering policies to groups in the Google domain. FortiClient EMS also handles the logs and web access statistics sent from the FortiClient Web Filter extensions.

Configuration:

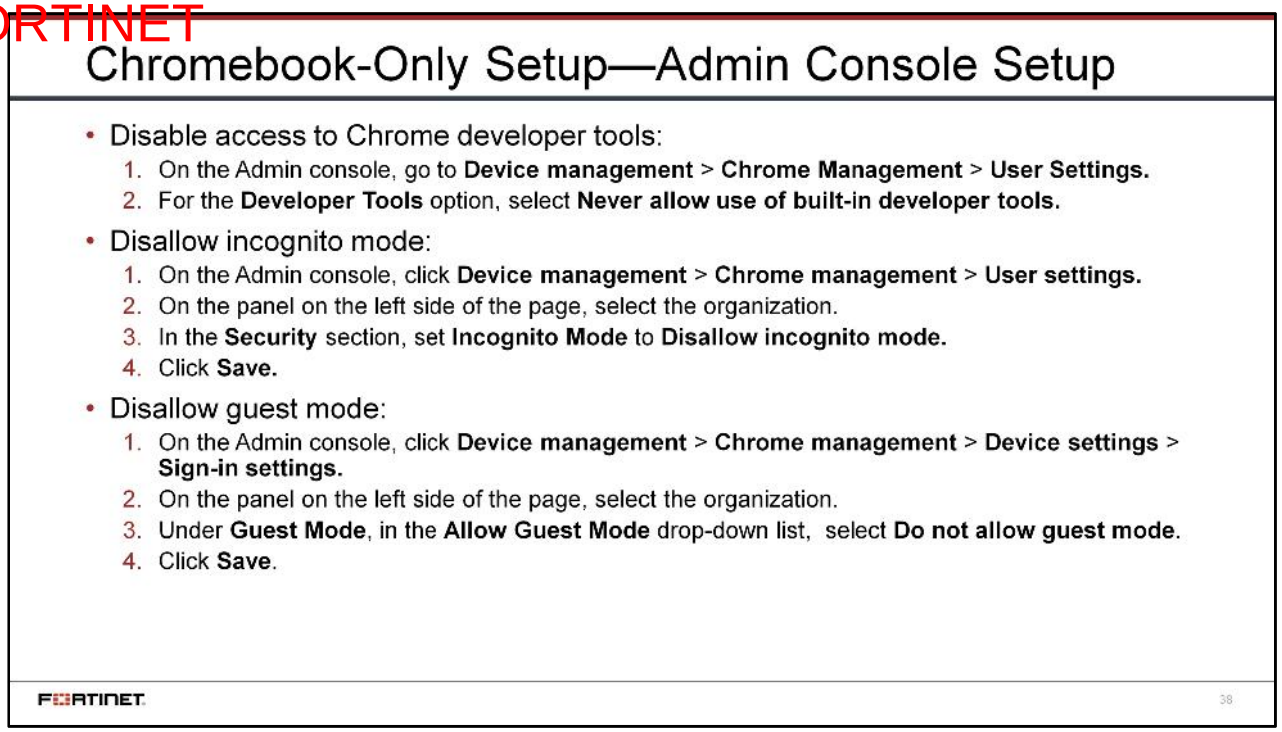
1. On FortiClient EMS, click **System Settings** > **Server** to locate the server name and port.
2. Create a text file that contains the following text:
   {
   "ProfileServerUrl": { "Value": "https://< ProfileServer >:< port for Profile Server >"}
   }
   For example:
   {
   "ProfileServerUrl": { "Value": "https://ems.mydomain.com:8443"}
   }
3. On the Google Admin console, click **Device management** > **Chrome Management** > **App Management** > **FortiClient Chrome Web Filter Extension** > **User settings**.
4. Click a domain or organization unit (OU).
5. In the right pane, under **Configure**, upload a new configuration file. You can also view the current settings.
6. Click **Save**.
7. Click **Device Management** > **Chrome** > **App Management** to view your configured Chrome apps.



Add certificates:

- The FortiClient Chromebook Web Filter extension communicates with FortiClient EMS using HTTPS connections.
- You must obtain an SSL certificate and add it to FortiClient EMS to allow the Chromebook extension to trust FortiClient EMS.
- If you use a public SSL certificate, you need to add only the public SSL certificate to FortiClient EMS.
- If you prefer to use a certificate that is not from a common certificate authority CA, you must add the SSL certificate to FortiClient EMS and push your certificate's root CA to the Google Chromebooks. Otherwise, the HTTPS connection between the FortiClient Chromebook Web Filter extension and FortiClient EMS will not work.

For more details about certificates, see the *FortiClientEMS Administration Guide*.



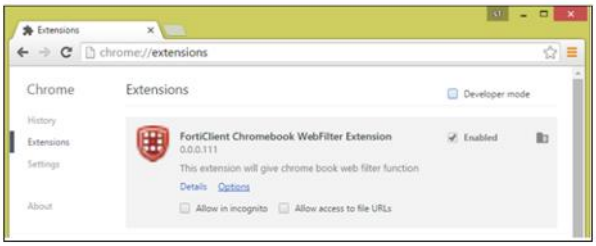
You should disable access to Chrome developer tools. This blocks users from disabling the FortiClient Web Filter extension.

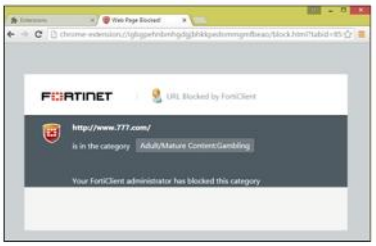
When users browse in incognito mode, extensions are bypassed. You should disallow incognito mode for managed Google domains.

You should disallow guest mode for managed Google domains.

Chromebook-Only Setup—Admin Console Setup

- Block Task Manager:
  1. On the Google Admin console, click **Device Management** > **Chrome Management** > **User settings** > **Apps and Extensions.**
  2. On the panel on the left side of the page, select the organization.
  3. Under **Task Manager**, in the drop-down list, select **Block users from ending processes with the Chrome Task Manager**.
  4. Verify FortiClient Web Filter



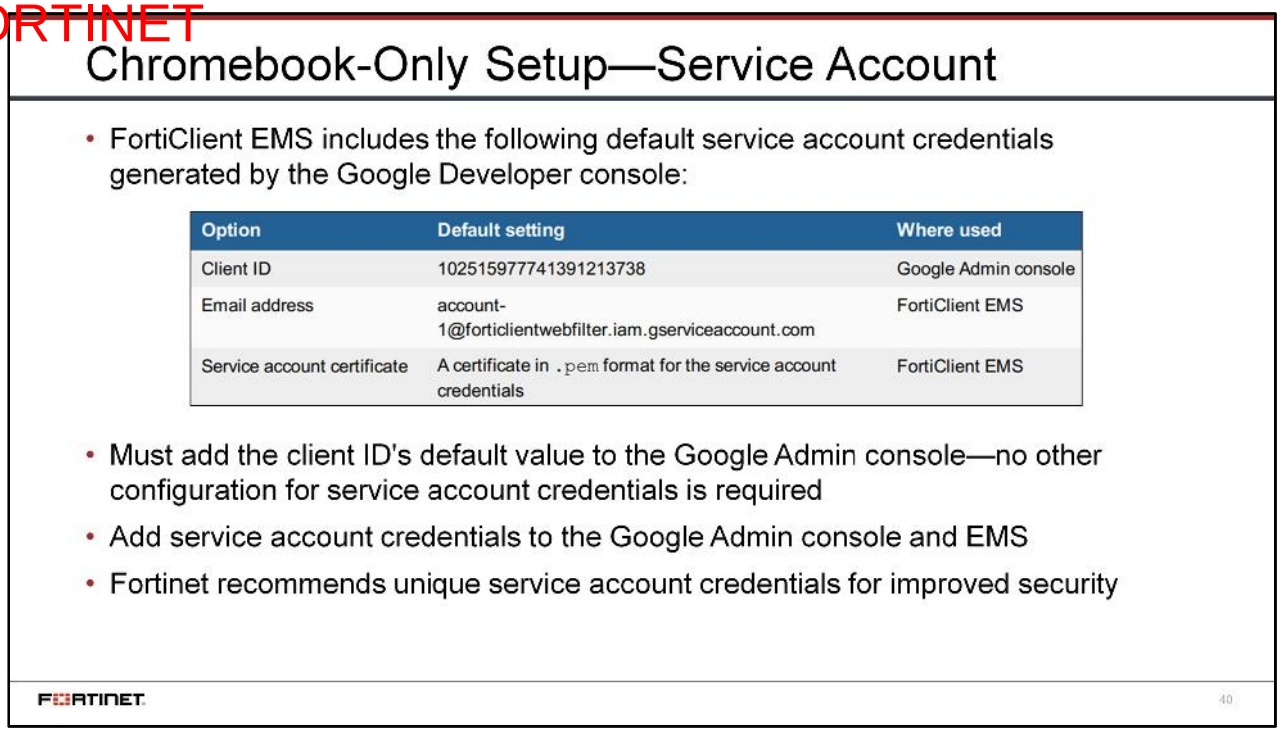


FORTINET 39

You should block **Task Manager** for managed Google domains. After you add the Google domain to FortiClient EMS, the Google Admin console automatically pushes the FortiClient Web Filter extension to the Chromebooks when users log in to the Google domain.

You can verify that the feature has become available on the Chromebooks.

1. Open the Google Chrome browser.
2. Enter the following address in the address bar: `chrome://extensions`.
3. Visit any gambling site, such as `http://www.777.com`, and confirm the site is blocked.



FortiClient EMS requires service account credentials generated by the Google Developer console. You can use the default service account credentials provided with FortiClient EMS. To configure the default service account credentials, you must add the client ID's default value to the Google Admin console. No other configuration for service account credentials is required. These settings allow Google to trust FortiClient EMS, which enables FortiClient EMS to retrieve information from the Google domain.

1. On the Google Admin console, click **Security** > **Advanced settings** (you may need to click “Show more" to see this) > **Manage API client access**.
2. Set the following options:
   A. For the **Client Name** option, add the client ID from the service account credentials.
   B. For the **API Scopes** option, add the following string:
   `https://www.googleapis.com/auth/admin.directory.orgunit.readonly,https://www.googleapis.com/auth/admin.directory.user.readonly`
3. Click **Authorize**.

Note that the service account credentials are a set. If you change one credential, you must change the other two credentials.

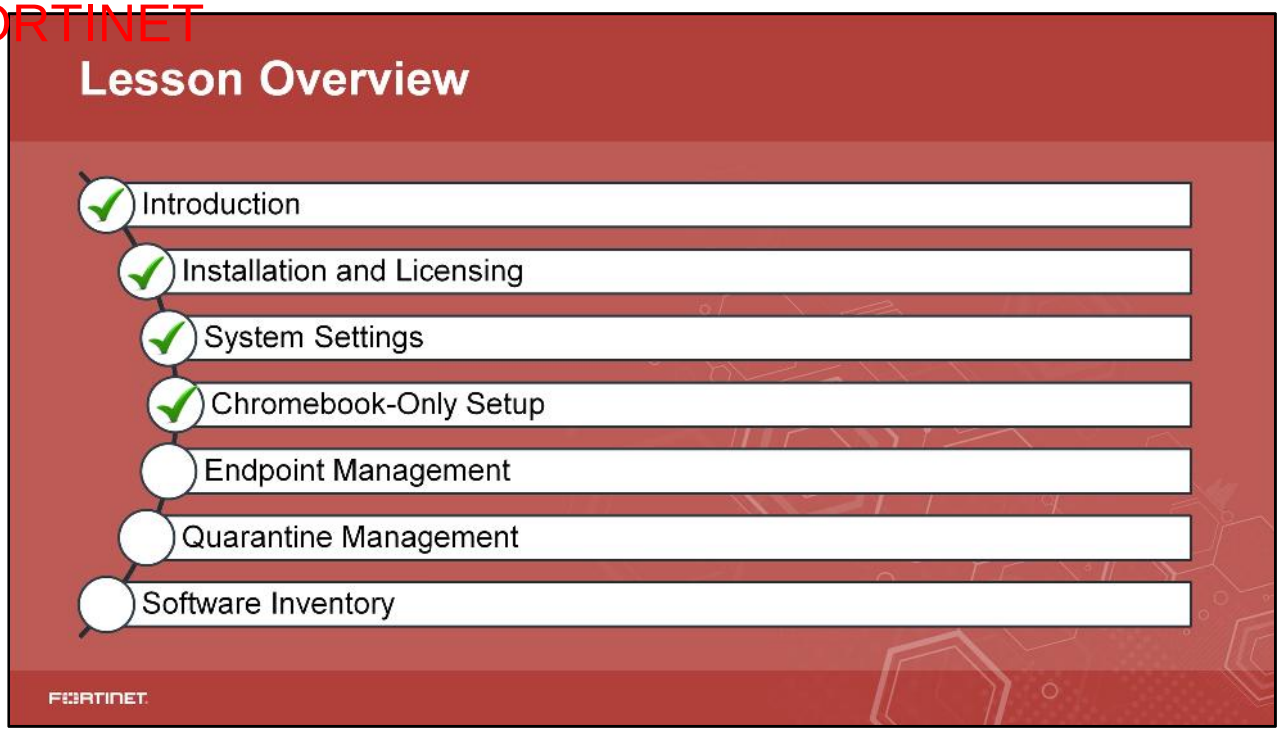
When using unique service account credentials for improved security, you must complete the following steps to add the unique service account credentials to the Google Admin console and FortiClient EMS:

1. Create unique service account credentials using the Google Developer console.
2. Add the unique service account credentials to the Google Admin console.
3. Add the unique service account credentials to FortiClient EMS.

Knowledge Check

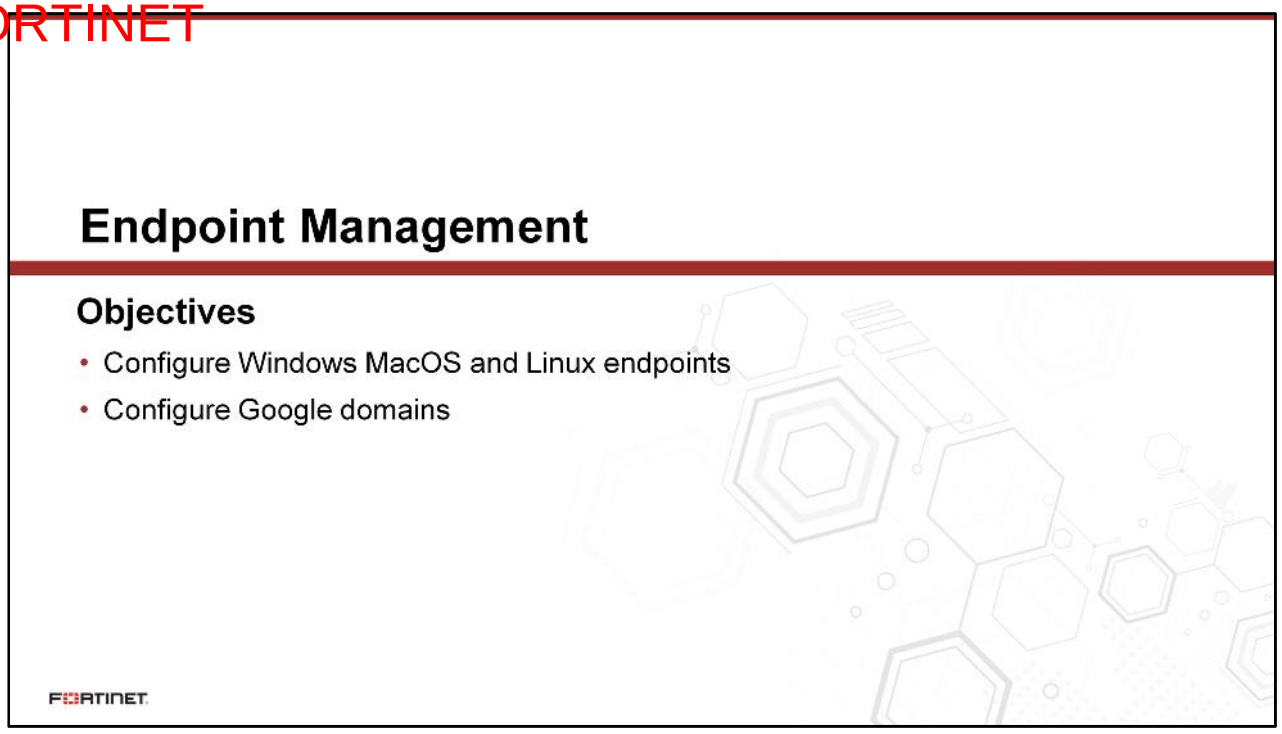
1. What type of Google account do you need to access the Google Admin console?
   - ✓ A. G Suite
   - B. Personal

2. What connection does FortiClient Chromebook web filter extension use to communicate?
   - ✓ A. HTTPS
   - B. HTTP



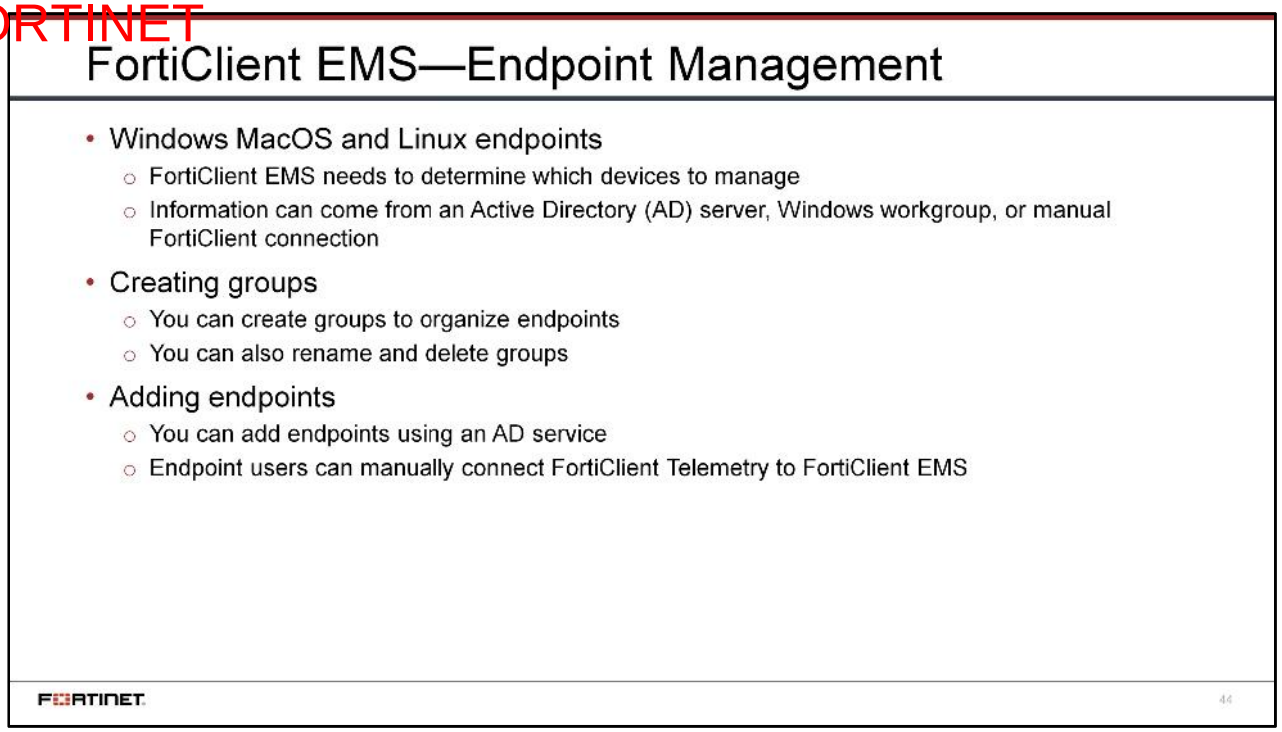
Good job! You now understand how to configure FortiClient EMS to manage Chromebooks.

Now, you will learn about endpoint management.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in using FortiClient for endpoint management, you will be able to configure Windows, Mac OS and Linux endpoints, as well as Google domains.



FortiClient EMS needs to identify which devices to manage. For Windows, and macOS, device information can come from an AD server, Windows workgroup, or manual FortiClient connection. Linux endpoint doesn't communicate with AD server.

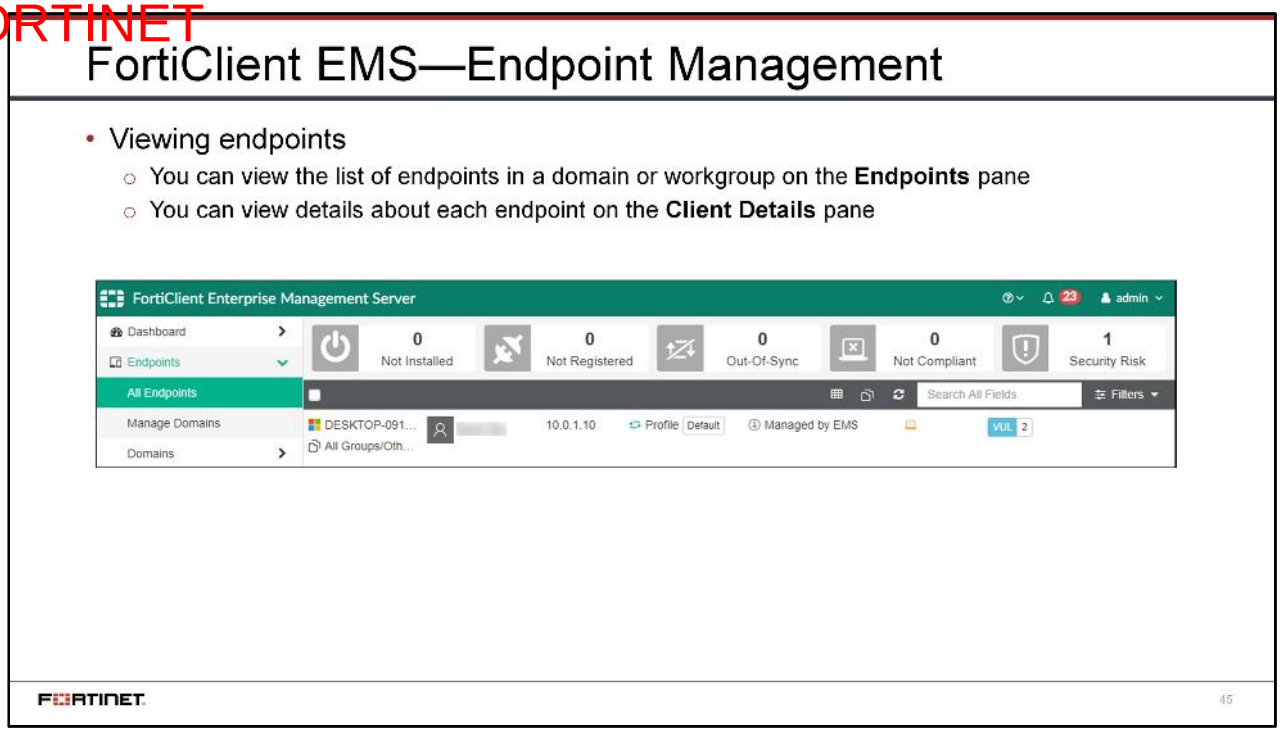
Click **Endpoints**, right-click a domain or workgroup to create, and then rename and delete groups.

Adding endpoints:

- Adding endpoints using an AD domain server:
  - You can import endpoints manually from an AD server. You can import and synchronize information about computer accounts with an LDAP or LDAPS service. You can add endpoints by identifying endpoints that are part of an AD domain server.
  - On EMS, click **Endpoints** > **Manage Domains** > **Add**.

Note that after importing endpoints from an AD server, you can edit the endpoints. These changes are not synced back to the AD server.

- Connecting manually from FortiClient:
  - Endpoint users can manually connect FortiClient Telemetry to FortiClient EMS by specifying the IP address for FortiClient EMS in FortiClient.
  - This process is sometimes called registering FortiClient to FortiClient EMS.



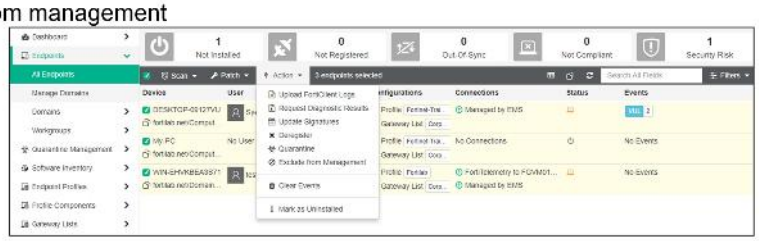
After you add endpoints to FortiClient EMS, you can view the list of endpoints in a domain or workgroup on the **Endpoints** pane.

You can also view details about each endpoint on the **Client Details** pane, and use filters to access endpoints with specific qualities.

You can save filter settings as bookmarks, then select the bookmarks to use them.

FortiClient EMS—Endpoint Management

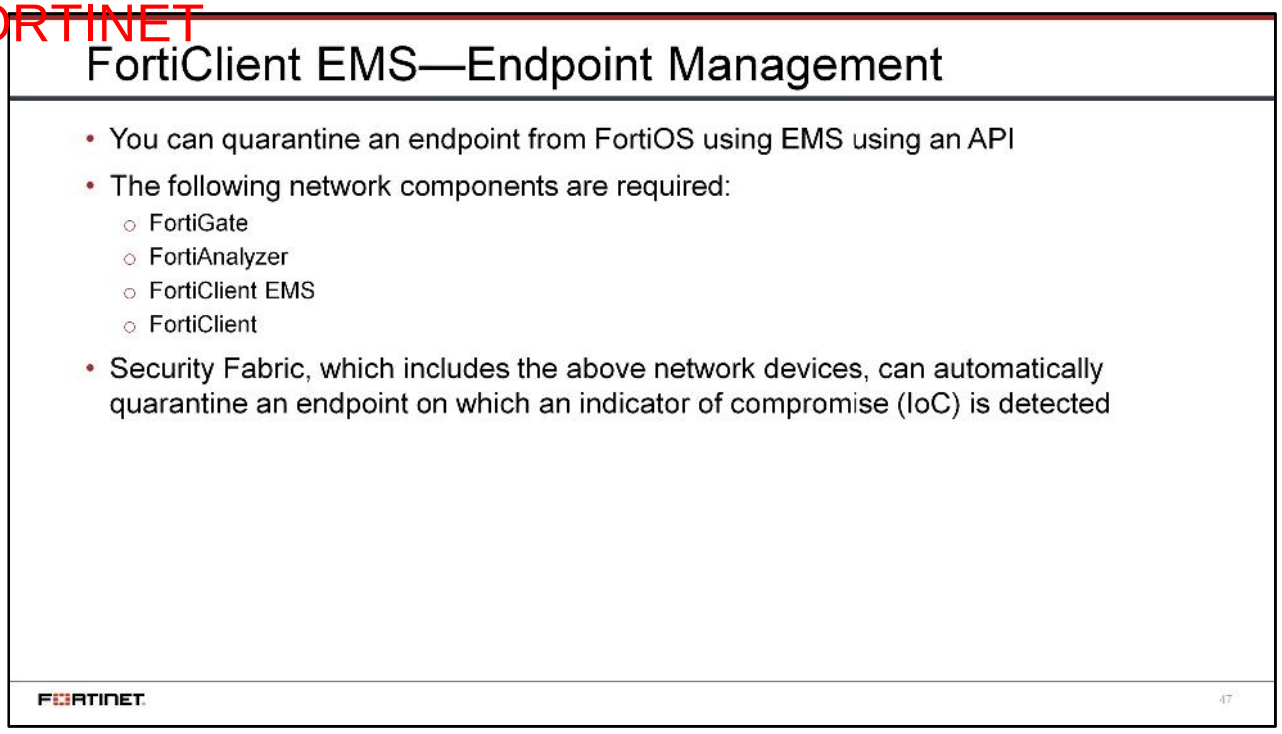
- You can manage the following on the **Endpoints** pane:
  - Running antivirus scans on endpoints
  - Running vulnerability scans on endpoints
  - Patching vulnerabilities on endpoints
  - Uploading FortiClient logs
  - Running the FortiClient diagnostic tool
  - Updating signatures
  - Disconnecting and connecting endpoints
  - Quarantining endpoints
  - Excluding endpoints from management
  - Deleting endpoints



FORTINET 46

On the Endpoints pane, you can do the following:

- A full or quick AntiVirus scan on endpoints. Scanning starts on the endpoints with the next FortiClient Telemetry communication.
- A vulnerability scan on endpoints. You can view the history of vulnerability scans for each endpoint on the **Client Details** pane.
- FortiClient patch detected critical and high vulnerabilities on endpoints.
- FortiClient can automatically patch many software:
  - If a vulnerability requires the endpoint user to download and install a software to patch a vulnerability, the FortiClient Console displays the information.
- FortiClient upload a log file from one or several endpoints to FortiClient EMS:
  - The log file is uploaded to the hard drive on the computer running EMS.
  - The uploaded log file is not visible in the FortiClient EMS GUI.
- EMS runs the FortiClient Diagnostic Tool on one or multiple endpoints and export the results to the hard drive on the computer on which you are running FortiClient EMS:
  - The exported information is not visible in the FortiClient EMS GUI.
- EMS request the FortiClient update signatures on the endpoints.
- Manually disconnect and connect endpoints using EMS:
  - From the **Action** menu, select **Deregister** to disconnect.
  - From the **Action** menu, select **Register** to connect.
- EMS can quarantine endpoints. Quarantined endpoints cannot access the network.
- EMS can exclude endpoints from management:
  - Right-click a domain or workgroup and select **Exclude from management**
- Disconnect endpoints from EMS:
  - Disconnect **Registered** endpoint first.
  - From the **Action** menu, select **Delete Device**.



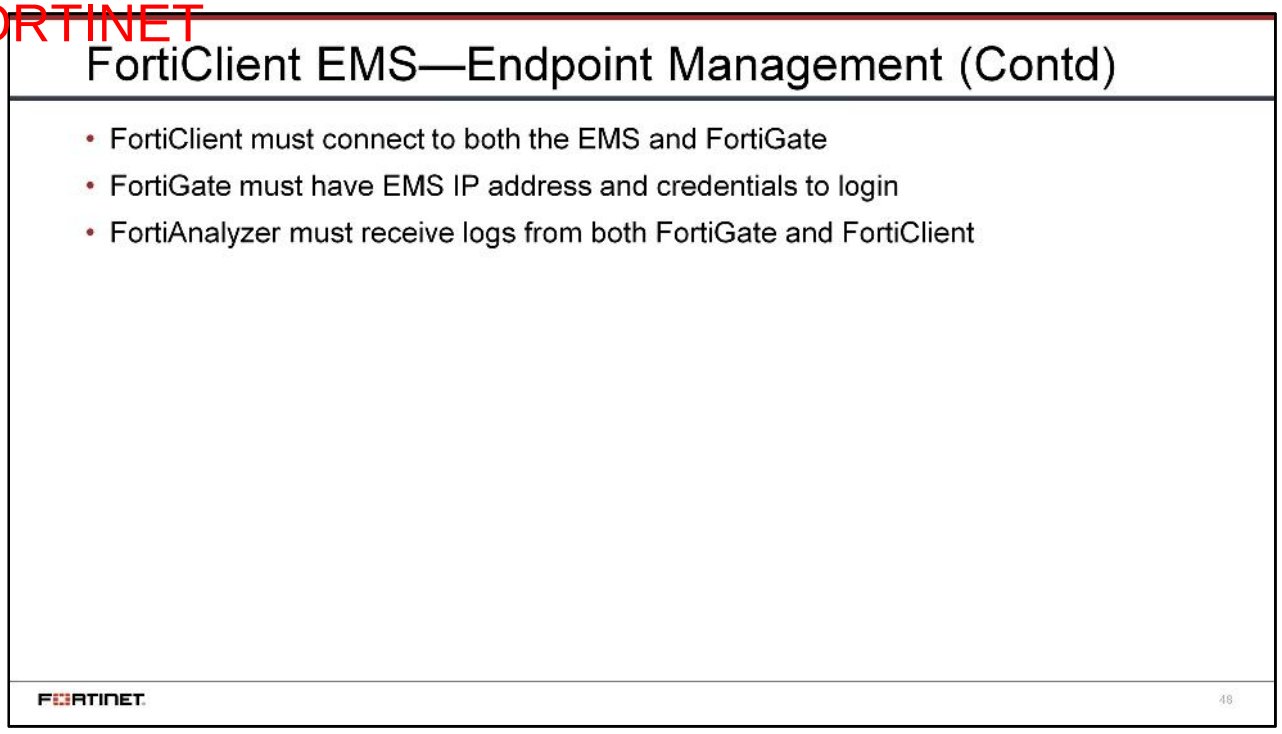
The Security Fabric offers visibility of endpoints at various monitoring levels. This configuration functions as follows:

1. FortiClient sends logs to FortiAnalyzer.
2. FortiAnalyzer discovers IoCs in the logs and notifies the FortiGate.
3. FortiGate identifies if the FortiClient is a connected endpoint and if it has the login credentials for the EMS that FortiClient is connected to.
    A. With this information, FortiGate sends a notification to EMS to quarantine the endpoint
4. EMS searches for the endpoint and sends a quarantine message to it
5. The endpoint receives the quarantine message and quarantines itself, blocking all network traffic.
    A. The endpoint notifies the FortiGate and EMS of the status change

Executing automation:
The following command triggers the quarantine action on the endpoint at `<endpoint_ip_address>`

- `diag endpoint forticlient-ems-rest-api queue-quarantine-ipv4 <endpoint_ip_address>`

Note that feature is not supported on FortiClient (Linux).



The following lists the prerequisites that must be met for FortiClient, EMS, and FortiGate

FortiClient:

- FortiClient must be installed on the endpoint and connected to both EMS and FortiGate

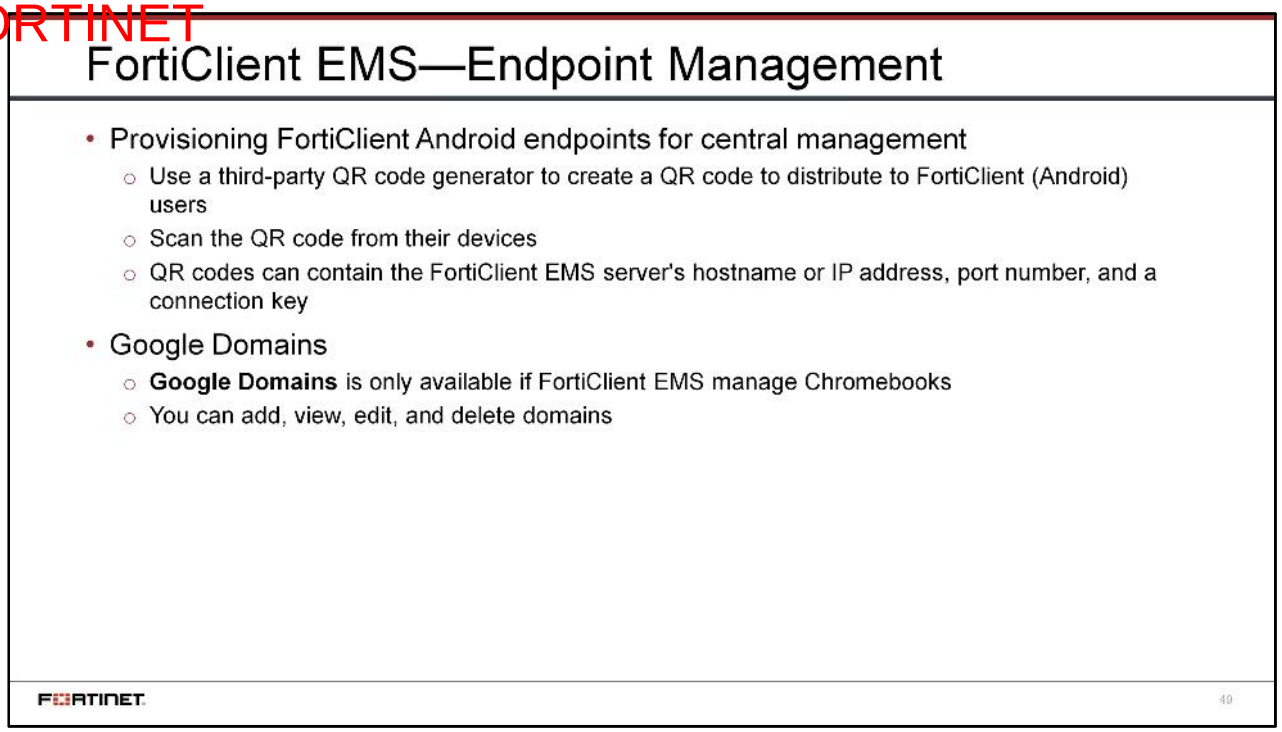
EMS:

- A profile must be assigned to the endpoint.
- A gateway list using the FortiGate's IP address must be assigned to the endpoint.
- The **Remote HTTPS access** must be enabled.

FortiGate

Before automation can be triggered, you must configure the following:

- Automation objects:
  - Automation trigger
    - You can create an automation trigger by entering the CLI command `config system automation-trigger .`
  - Automation action
    - You can create an automation action by entering the CLI command `config system automation-action`.
  - Automation stitch
    - You can create automation stitch by entering the CLI command `config system automation-stitch`.
  - EMS firewall address object
    - You can create an EMS firewall address object by entering the CLI command `config firewall address`.
  - Endpoint control FCT-EMS object
    - You can create an endpoint control FCT-EMS object by entering the CLI command `config endpoint-control forticlient-ems`.



You can use a third-party QR code generator to create a QR code to distribute to FortiClient (Android) users. FortiClient (Android) users can scan the QR code from their devices to automatically enable FortiTelemetry and attempt a connection to the specified FortiClient EMS server and FortiGate.
QR codes can contain the FortiClient EMS server's hostname or IP address, port number, and a connection key. Only the FortiClient EMS hostname/IP address is required; all other fields are optional.

FortiClient EMS needs to identify which devices to manage. Device information comes from the Google Admin console. **Google Domains** is only available if **EMS for Chromebooks Settings** is selected in **System Settings** > **Server**.

You can add domains by clicking **Google Domains** > **Manage Domains**, and clicking **Add**. After you add domains to FortiClient EMS, you can view, edit, and delete.

Note that section is only applicable if you are using FortiClient EMS to manage Google Chromebooks.

Knowledge Check

1. What are the two methods to add endpoints to FortiClient EMS?
   - ✓ A. Microsoft Active Directory (AD) server and manual connection from FortiClient
   - B. Import XML configuration from FortiGate and FortiClient

2. Which of the following network components are required to enable FortiOS to quarantine an endpoint?
   - A. Chromebook Web Filter extension
   - ✓ B. FortiGate, FortiAnalyzer, FortiClient EMS, and FortiClient

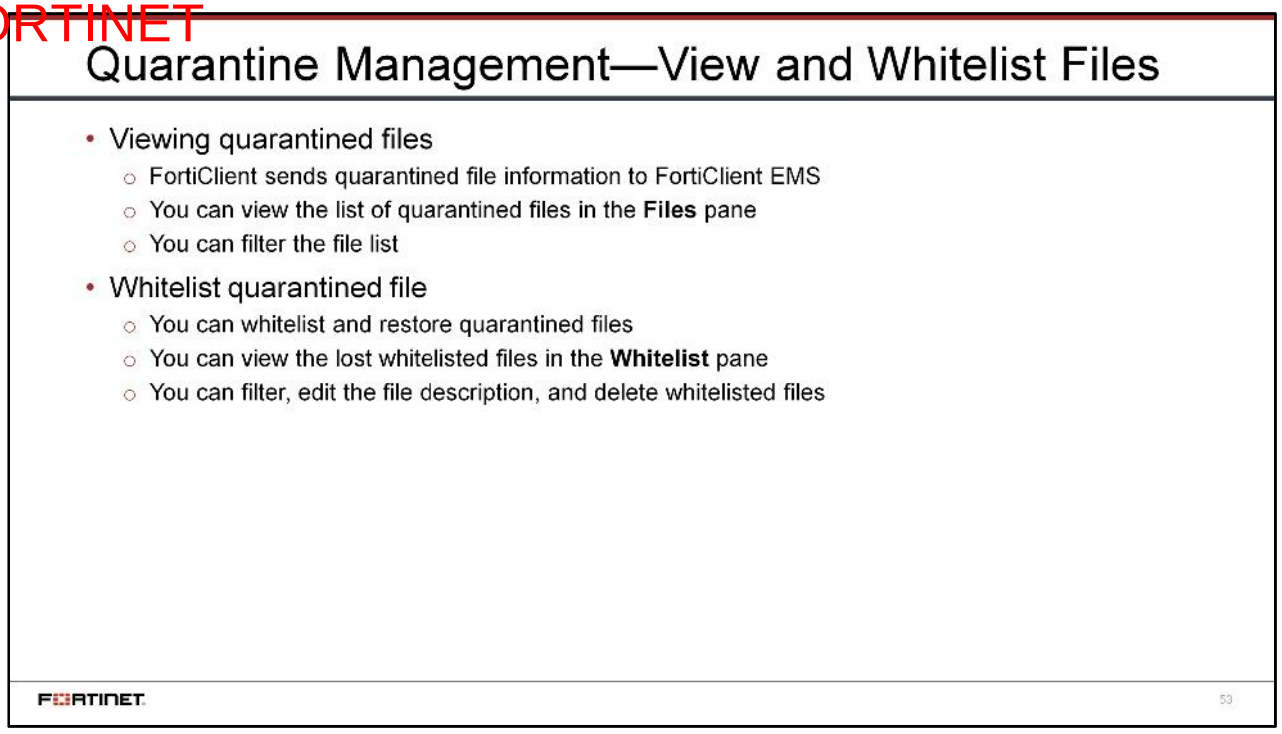
FORTINET 50

Good job! You now understand endpoint management for Windows, macOS, Linux, and Chromebook user endpoints on FortiClient EMS.

Now, you will learn about quarantine management.

After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in using FortiClient EMS to manage quarantined files, you will be able to view and whitelist quarantined files.



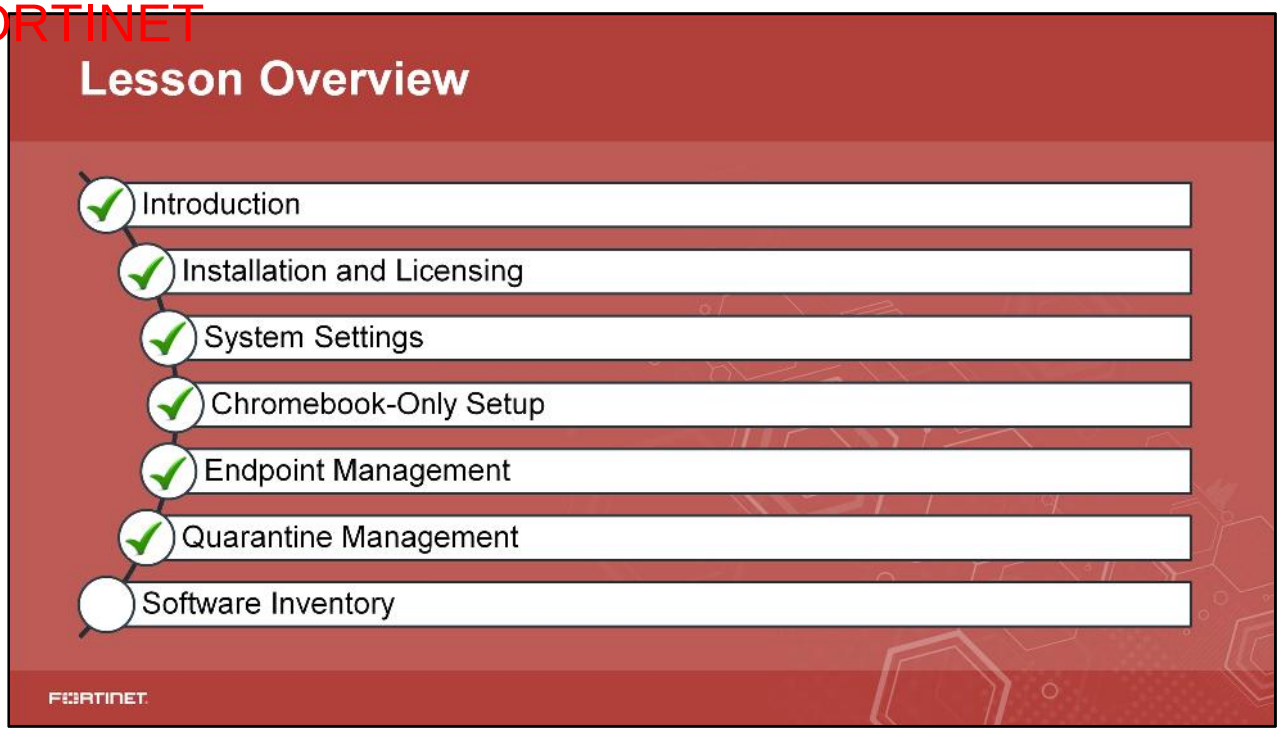
The FortiClient EMS administrator can view quarantined file information for all managed endpoints on the **Files** pane and whitelist files from FortiClient EMS if needed.

FortiClient sends quarantined file information to FortiClient EMS. After FortiClient quarantines files on endpoints and sends the quarantined file information to FortiClient EMS, you can view the list of quarantined files in the **Files** pane. You can also view details about each quarantined file and use filters to access quarantined files that have specific qualities.

- **Quarantine Management** > **Files**: The list of quarantined files, a quick status bar, and a toolbar display in the content pane.

You can whitelist and restore quarantined files. This releases the files from quarantine and makes them accessible on the endpoint with the next Telemetry communication between FortiClient EMS and FortiClient.

1. Click **Quarantine Management** > **Files**.
2. Select the files you want.
3. Click **Whitelist & Restore**.
4. In the confirmation dialog, click **Yes**, and then **Okay**.
   The file status changes to **Quarantined & Whitelisted**.



Good job! You now understand how FortiClient EMS manages quarantined files.

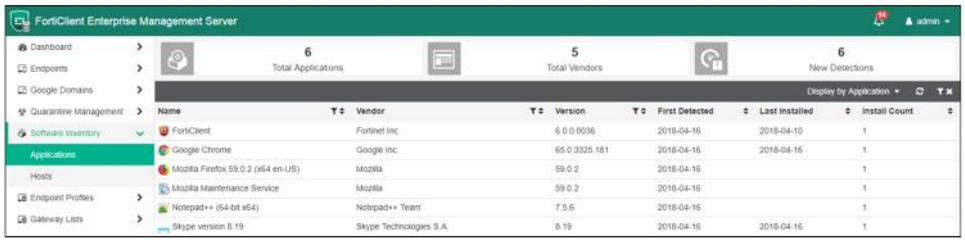
Now, you will learn how FortiClient EMS manages the software inventory on endpoints.

After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in using FortiClient EMS to view the software inventory on endpoints, you will be able to determine what applications are installed.

Software Inventory—Applications

- You can centrally view a list of software installed on all endpoints
- The list includes details for each application, such as vendor and version information
- **Applications**
  - Shows information about installed applications for all managed endpoints
  - You can filter by application



FORTINET

56

You can centrally view a list of software installed on all endpoints. The list includes details for each application, such as vendor and version information. You can view this information by application or vendor on the **Applications** pane, or by host on the **Hosts** pane. FortiClient sends installed application information to FortiClient EMS.

The FortiClient EMS administrator can view installed application information for all managed endpoints on the **Applications** pane.

- **Software Inventory** > **Applications**

Total Applications: Number of applications that have been installed on all managed endpoints. Click to display the list of installed applications.

Total Vendors: Number of vendors whose applications have been installed on managed endpoints. Click to display the list of installed applications sorted by vendor.

New Detections: Number of applications that have been detected as newly installed since the last Telemetry communication. Click to display newly detected applications sorted by date detected.

Display by: Select to toggle between the following options:

- Display applications alphabetically by application name.
- Sort applications by vendor name.

Refresh: Click to refresh the list of applications on the **Content** pane.

Clear Filters: Click to clear all filters applied to the list of files.

Name: This is the name of the installed application.

Vendor: This is the name of the installed application's vendor.

Version: This is the version number of the installed application.

First Detected: This is the date the application was first detected as installed on the endpoint.

Last Installed: This is the date the application was last installed on an endpoint.

Install Count: This is the number of endpoints the application is installed on.

You can apply filters by application name, vendor name, and version number.

Software Inventory—Hosts

- **Hosts**
  - Shows information about installed application for all managed endpoints by host
  - You can filter by host

FORTINET 57

The FortiClient EMS administrator can view installed applications information for all managed endpoints by host on the **Hosts** pane.

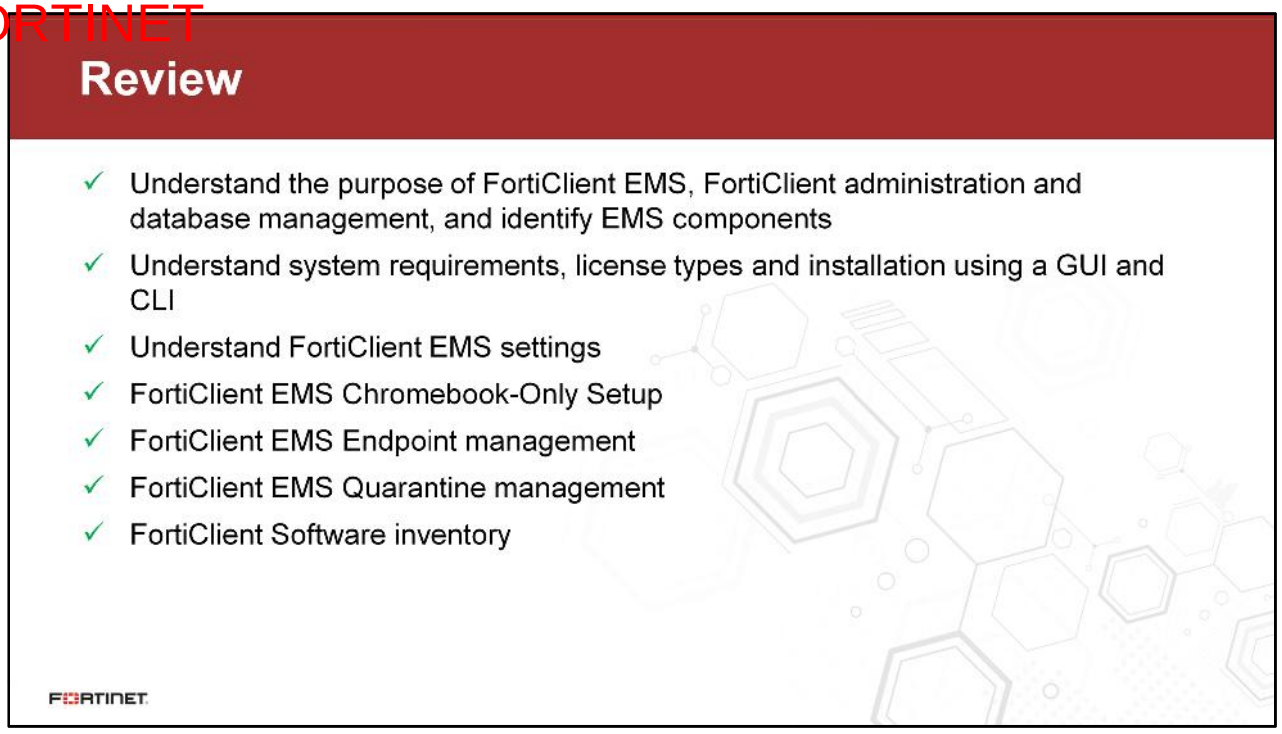
- **Software Inventory** > **Hosts**

Applications: Number of applications that have been installed on all managed endpoints
Operating Systems: Number of different operating systems on managed endpoints
View Details: Displays list of software installed on the selected endpoint
Refresh: Click to refresh the list of applications in the content pane
Clear Filters: Click to clear all filters applied to the list of files
Host: Host name
User: Name of the endpoint user
OS: Operating system installed on the endpoint
IP: IP address of the endpoint
Application Count: Number of applications installed on the endpoint
Last Installation: Date of the most recent application installation on the endpoint

You can apply filters by host name, user name, OS name, and IP address.

Congratulations! You have completed this lesson.

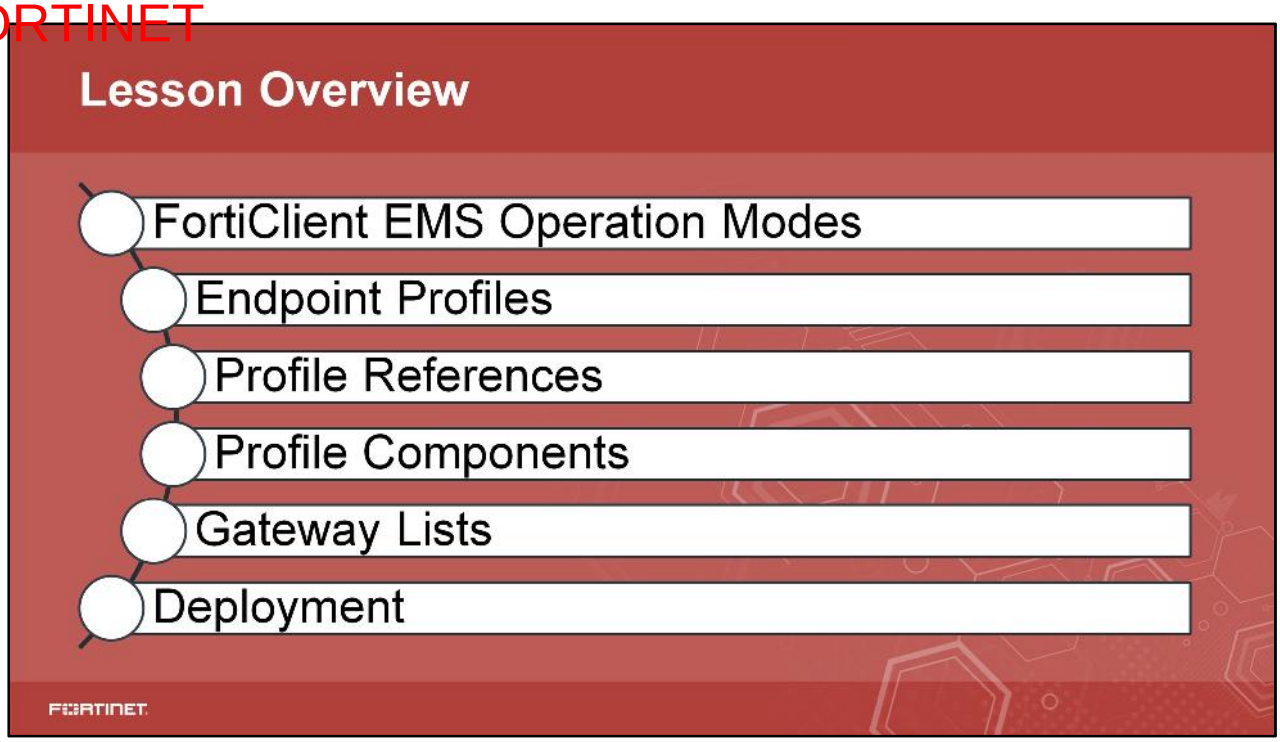
Now, you will review the objectives that you covered in this lesson.



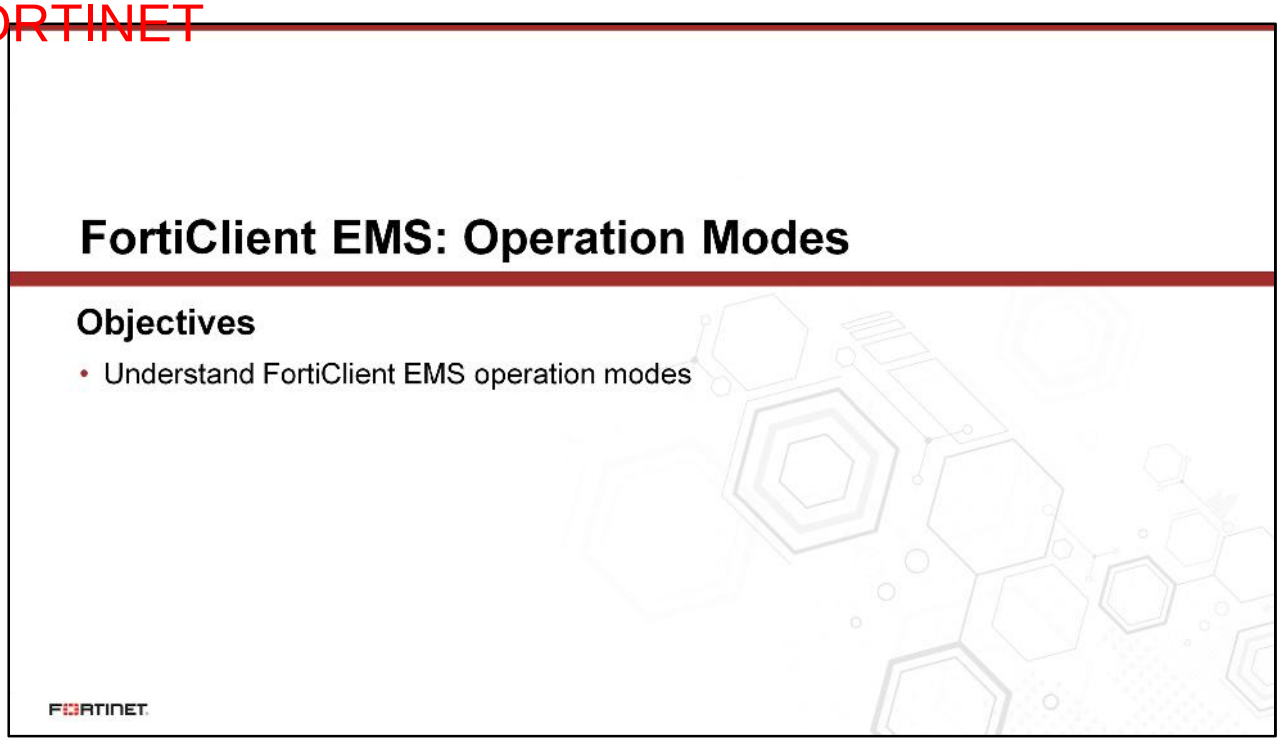
This slide shows the objectives that you covered in this lesson.

By mastering the objectives covered in this lesson, you learned how to install, configure, and administer FortiClient EMS. You also learned how to manage a large number of endpoints.

In this lesson, you will learn how to deploy, provision, and manage FortiClient on endpoints using FortiClient EMS.



In this lesson, you will learn about the topics shown on this slide.

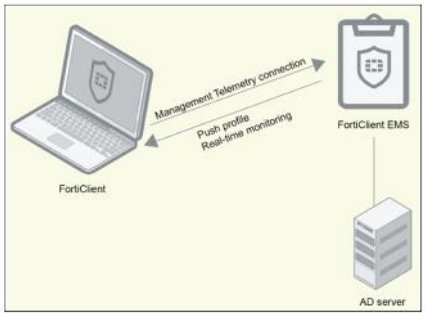


After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence understanding FortiClient EMS, you will be able to use it effectively in your network.

Standalone Mode Without Security Fabric

- FortiClient EMS provides FortiClient endpoint provisioning
- FortiClient endpoints connect FortiClient Telemetry to FortiClient EMS to receive configuration information from FortiClient EMS
- Does not support compliance
- Endpoint status shows as **Managed by EMS**

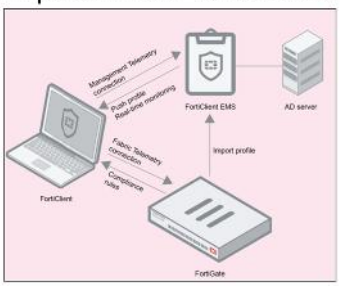


FORTINET

FortiClient EMS in standalone mode provides FortiClient endpoint provisioning. FortiClient endpoints connect FortiClient telemetry to FortiClient EMS to receive configuration information from FortiClient EMS. This operation mode does not support compliance.

Integrated Mode With Security Fabric

- FortiClient EMS provides FortiClient endpoint provisioning
- FortiGate provides compliance rules to the endpoint
- FortiClient endpoints connect FortiClient Telemetry:
  - To receive configuration information from FortiClient EMS
  - To receive compliance rules from FortiGate
- Profiles can also be imported from FortiGate and FortiManager to FortiClient EMS



FORTINET 5

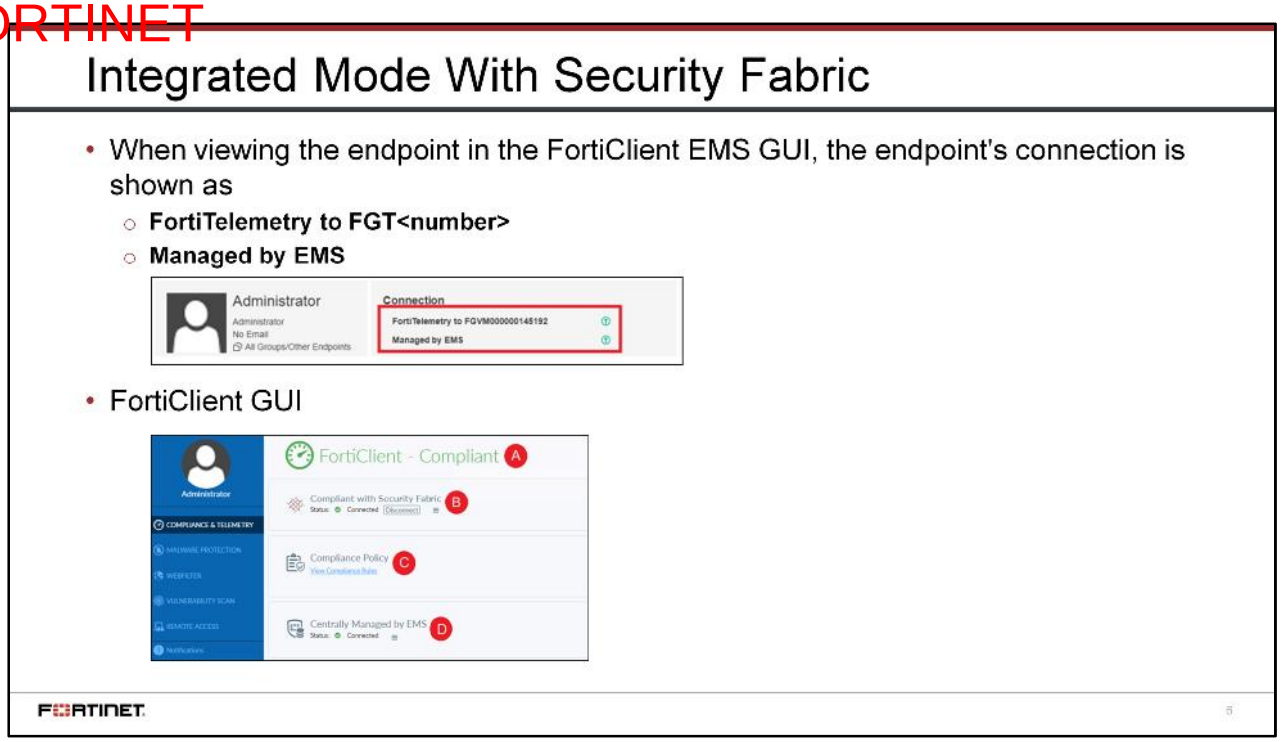
You can integrate FortiGate with FortiClient EMS. When used together, FortiGate performs endpoint control and network access compliance (NAC), and FortiClient EMS deploys and manages FortiClient software on endpoints.

When FortiGate is configured for NAC, you can use FortiOS to create a FortiClient compliance profile that defines compliance rules and non-compliance action. The compliance rules define what configuration FortiClient software and the endpoint must have for the endpoint to maintain access to the network through FortiGate.

FortiOS 6.0.0 and later versions use one of the following two methods to determine endpoint compliance. The FortiOS configuration determines which one of the following two methods is used:

- An endpoint is considered compliant if FortiClient is managed by the EMS server authorized on FortiOS
- An endpoint is considered compliant if it complies with the specific compliance rules configured on FortiOS

FortiOS versions earlier than 6.0.0 determine an endpoint to be compliant if it complies with the compliance rules configured in FortiOS. The non-compliance action defines what action FortiGate takes when endpoints fail to comply with the compliance rules. When the non-compliance action is **block**, FortiGate blocks endpoints from accessing the network when they fail to comply with the compliance rules. When the non-compliance action is **warn**, FortiGate warns
the endpoint about non-compliance, but allows network access after the endpoint user acknowledges the warning.

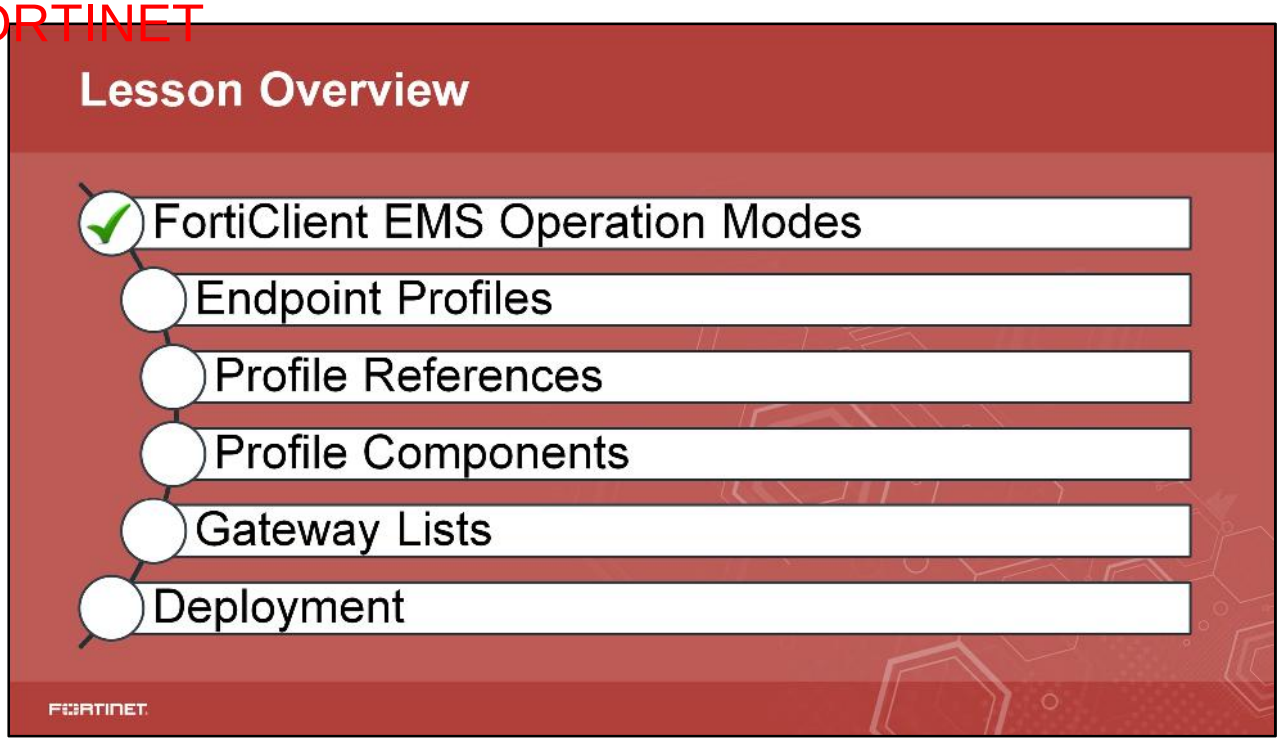


Label A: This shows the endpoint is connected to the specified FortiGate and is compliant to security policy rules defined under FortiClient Compliance profiles on that FortiGate.
Label B: This shows the endpoint is connected to and receiving compliance rules from the specified FortiGate. Click the menu icon to view the FortiGate's IP address, hostname, and serial number.
Label C: When FortiClient Telemetry is connected to FortiGate, you can view the compliance rules from FortiGate. The compliance rules communicate the configuration required for the FortiClient Console and the endpoint to remain compliant. When the endpoint has a non-compliant status, an exclamation mark indicates which compliance rules are not met.
Label D: View the FortiClient EMS server's name. This indicates FortiClient EMS is managing and provisioning configuration to the endpoint. Click the menu icon to view the FortiClient EMS server's IP address, hostname, and serial number.

Although the compliance rules define what configuration FortiClient software and the endpoint must have, the FortiClient compliance profile from FortiGate does not include any configuration information. The endpoint user or administrator is responsible for configuring the FortiClient Console to adhere to the compliance rules. An administrator can use FortiClient EMS to configure the FortiClient Console.

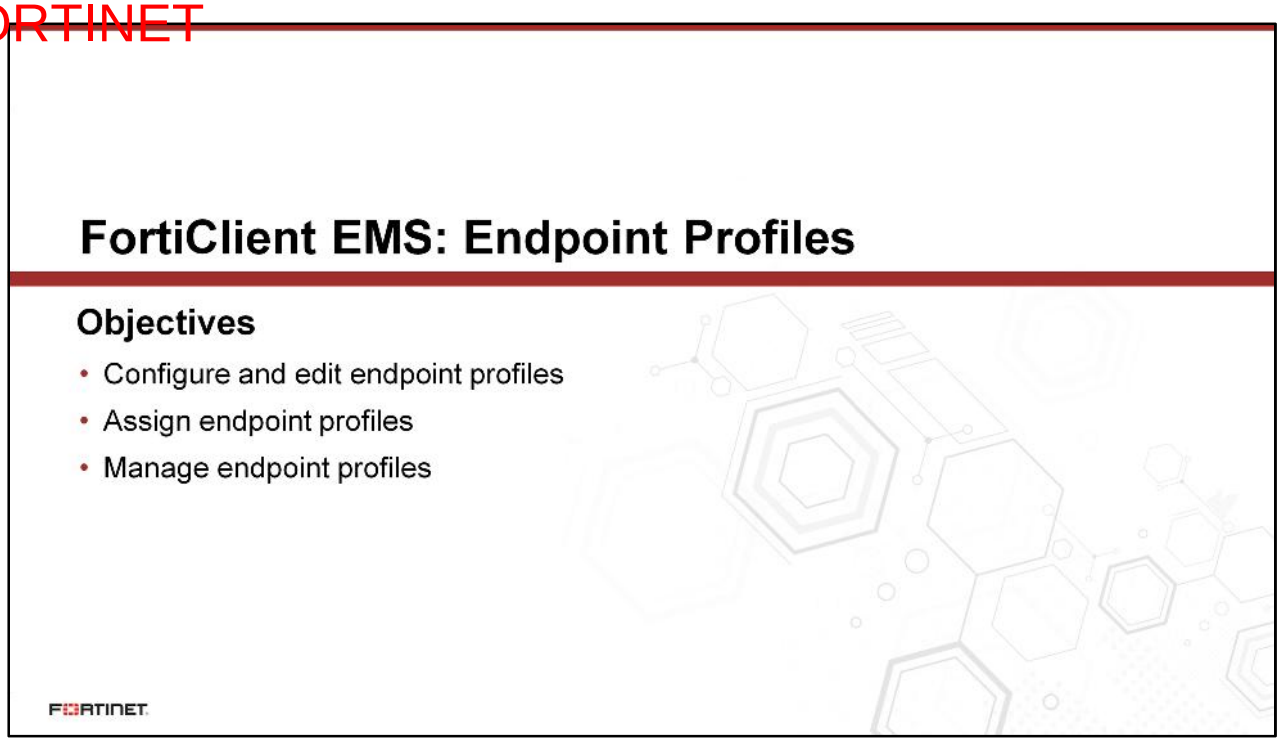
Knowledge Check

1. Which type of information does FortiClient EMS in standalone mode not support?
   - A. FortiClient configuration information
   - ✓ B. FortiClient compliance information
2. Which of these devices provide compliance?
   - ✓ A. FortiGate
   - B. FortiClient EMS



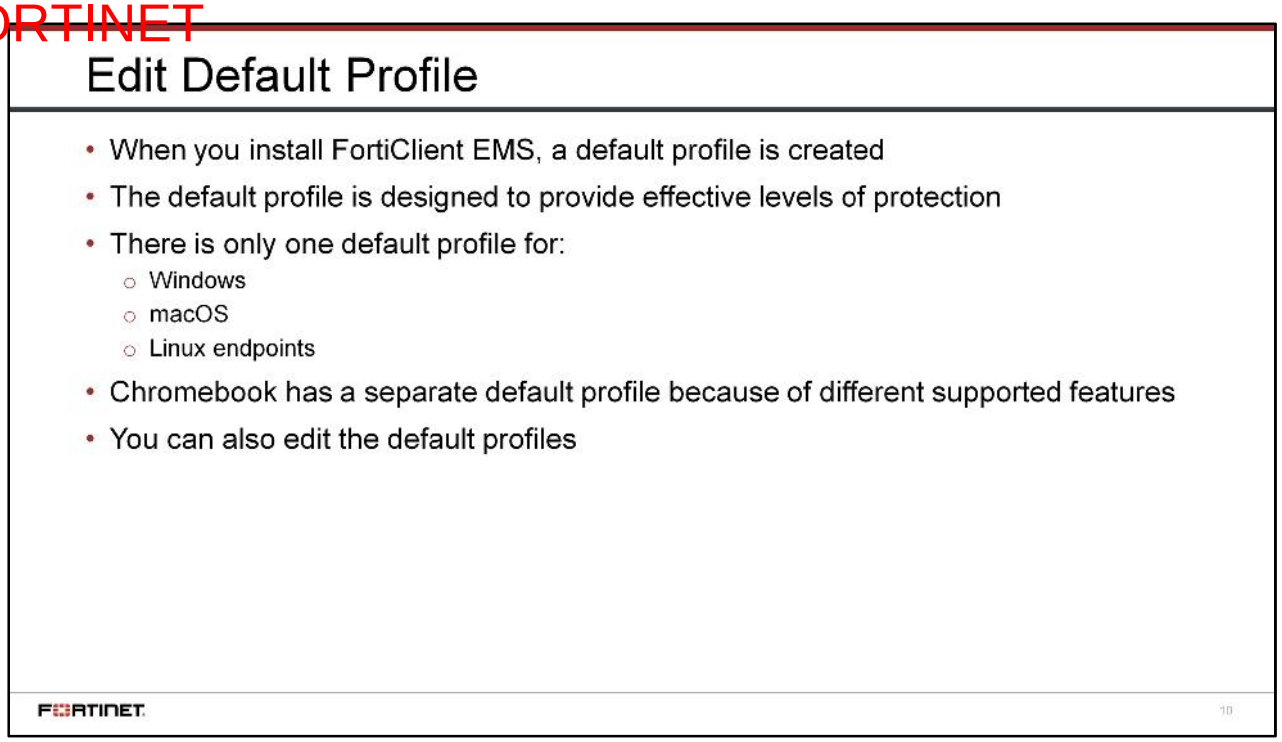
Good job! You now understand FortiClient EMS operation modes.

Now, you will learn about endpoint profiles.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in configuring, editing, assigning, and managing endpoint profiles, you will be able to use endpoint profiles to define the features installed on FortiClient endpoints.

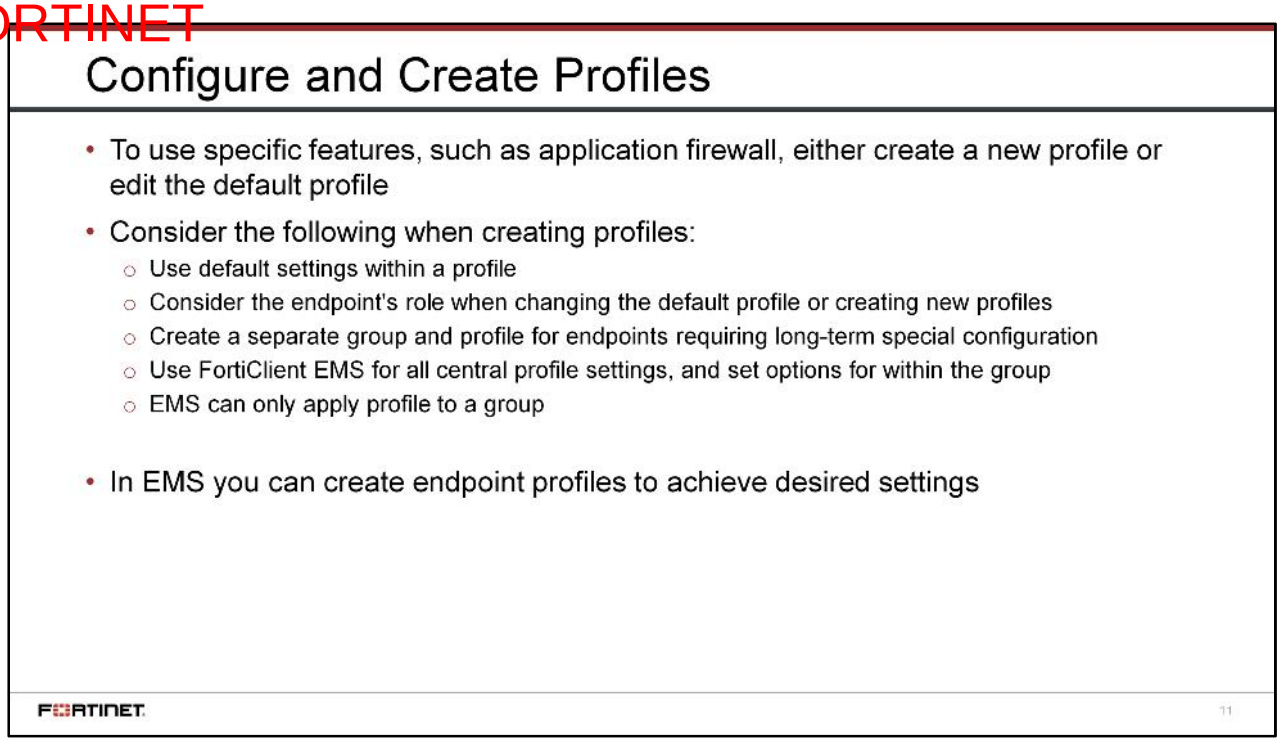


When you install FortiClient EMS, a default profile is created. This profile is applied to any groups you create. The default profile is designed to provide effective levels of protection. There are separate default profiles for Windows, macOS, and Linux endpoints and for Chromebook endpoints.

You can create and configure separate profiles for Windows, macOS, and Linux endpoints and for Chromebook endpoints. You can also edit the default profiles.

You can edit to add or remove settings in the default profile. You can revert to the default settings by clicking **Revert to Default**.

- Do one of the following:
  - To edit the default profile for Chromebooks, click **Endpoint Profiles** > **Local Chromebook Profiles**, and click the **Default - Chromebooks** profile
  - To edit the default profile for other endpoints, click **Endpoint Profiles** > **Local Profiles**, and click the **Default** profile.
- Configure the settings on the tabs
- Click **Save** to save the profile



The default profile is designed to provide effective levels of protection. To use specific features, such as application firewall, create a new profile or edit the default profile.

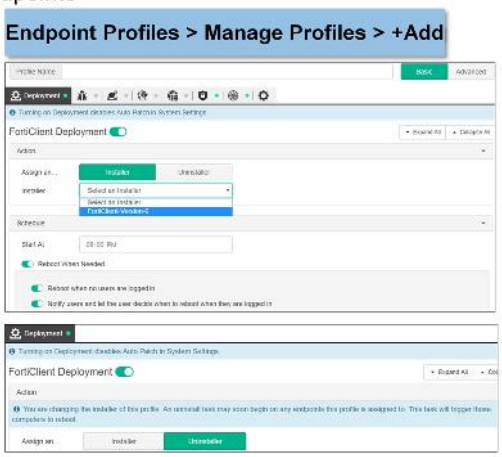
You can create endpoint profiles to achieve desired settings, such as:

- Profiles to configure FortiClient
- Profiles to deploy FortiClient
- Profiles to uninstall FortiClient

Note that an individual FortiClient must belong to a group before the settings can be pushed to them.

Configure and Create Profiles (Contd)

- Profiles to configure FortiClient
  - A profile that excludes any installation or uninstallation of FortiClient software on endpoints
  - Type use to only configure FortiClient software on endpoints
- Profiles to deploy FortiClient
  - Must create a new profile to deploy FortiClient
  - You cannot add a FortiClient installer to the default profile
- Profiles to uninstall FortiClient
  - You can configure a profile to uninstall FortiClient from endpoints

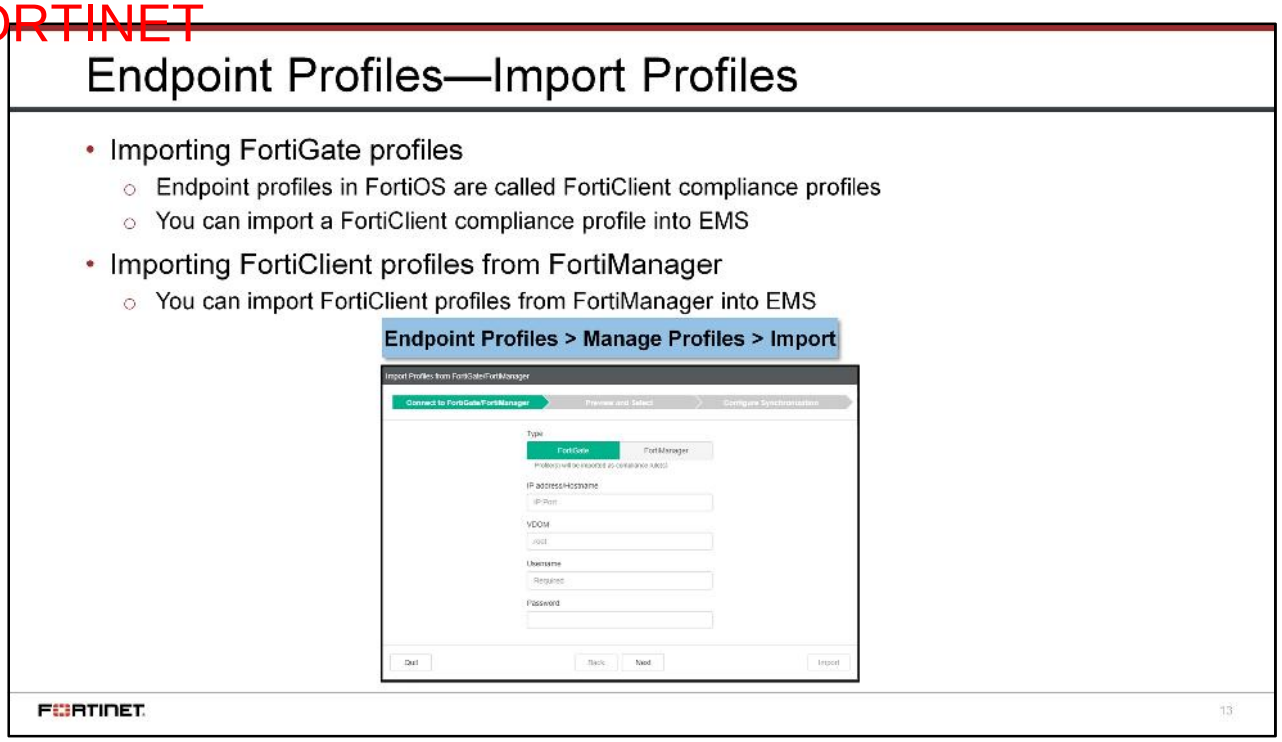


FORTINET 12

Profiles to configure FortiClient: This type of profile excludes any installation or uninstallation of FortiClient software on endpoints. This type of profile is used to configure FortiClient software on endpoints. On the **Deployment** tab, leave **FortiClient Deployment** disabled.

Profiles to deploy FortiClient: You must create a new profile to deploy FortiClient to endpoints as you cannot add a FortiClient installer to the default profile. You must also add FortiClient installers to FortiClient EMS before you can select the installers in a profile. The selected FortiClient installer in a profile controls which tabs are displayed for configuration in the profile. Only the tabs for the features in the selected installer are displayed for configuration in the profile. For example, if the installer includes only the VPN feature, only the **VPN** tab is displayed for you to configure. The **System Settings** tab is always displayed. To add a tab, go to **Profile Components** > **Manage Installers**.
You can disable a feature included in the installer, then enable it later in the profile.

Profiles to uninstall FortiClient: You can configure a profile to uninstall FortiClient from endpoints. You must create a new profile for this configuration. You cannot use the default profile to uninstall FortiClient from endpoints.



Importing FortiGate profiles: In FortiOS, endpoint profiles are called FortiClient compliance profiles. You can import a FortiClient compliance profile into EMS, then edit the profile in FortiClient EMS to add a FortiClient installer or add configuration information that supports FortiGate compliance rules.

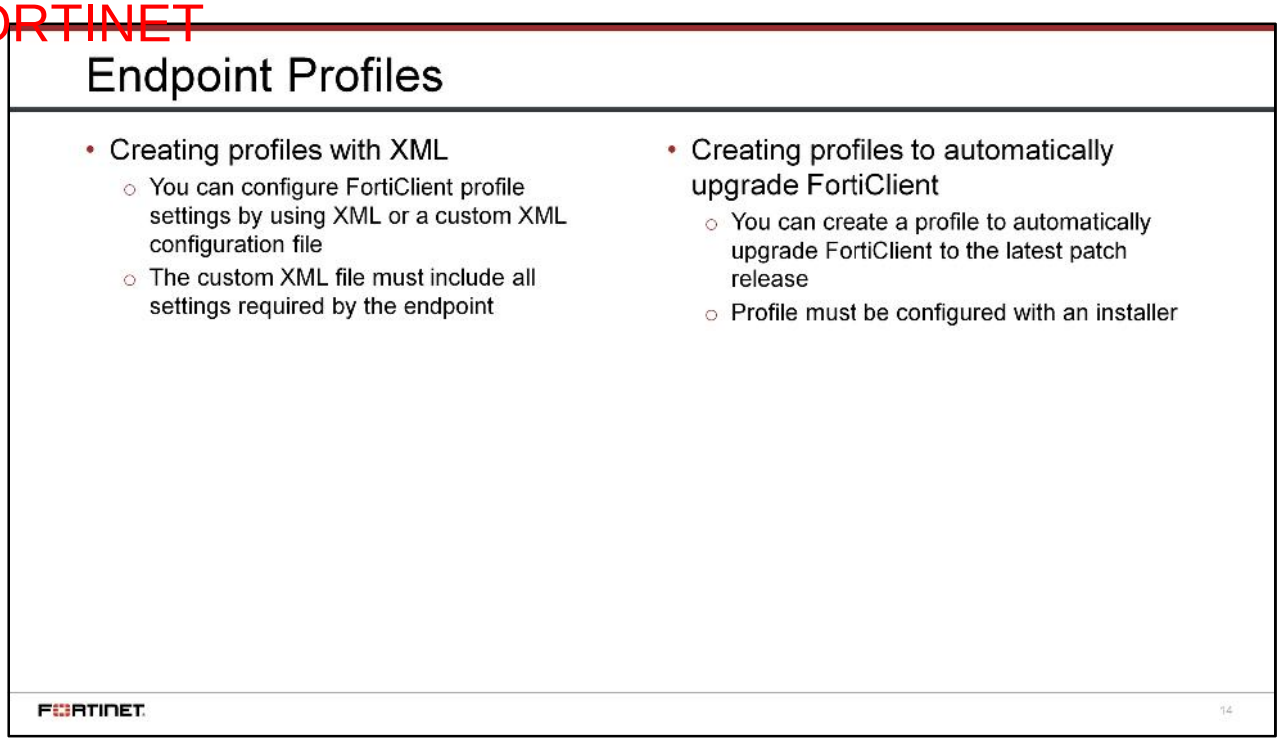
To import profiles successfully from FortiOS to FortiClient EMS, the HTTPS port on FortiGate must be open. In FortiOS, click **Network** > **Interfaces** > **Administrative Access** and select the **HTTPS** check box.

Importing FortiClient profiles from FortiManager: You can import FortiClient profiles from FortiManager into EMS, then edit the profile in FortiClient EMS to add a FortiClient installer or add configuration information that supports the FortiGate compliance rules.

To import profiles successfully from FortiManager to FortiClient EMS, the HTTPS port on FortiManager must be open. In FortiManager, click **System Settings** > **Network** and select the **HTTPS** check box.

You need following information to connect:

- **IP address/Hostname**: Enter the IP address and port of the FortiGate or FortiManager device from which the profile is being imported, in the format: **<ip address>**:**<port>**
- **VDOM**: Enter a VDOM name from the FortiGate/FortiManager if applicable
- **Username**: Enter the FortiGate's or FortiManager's login username
- **Password**: Enter the FortiGate's or FortiManager's login password

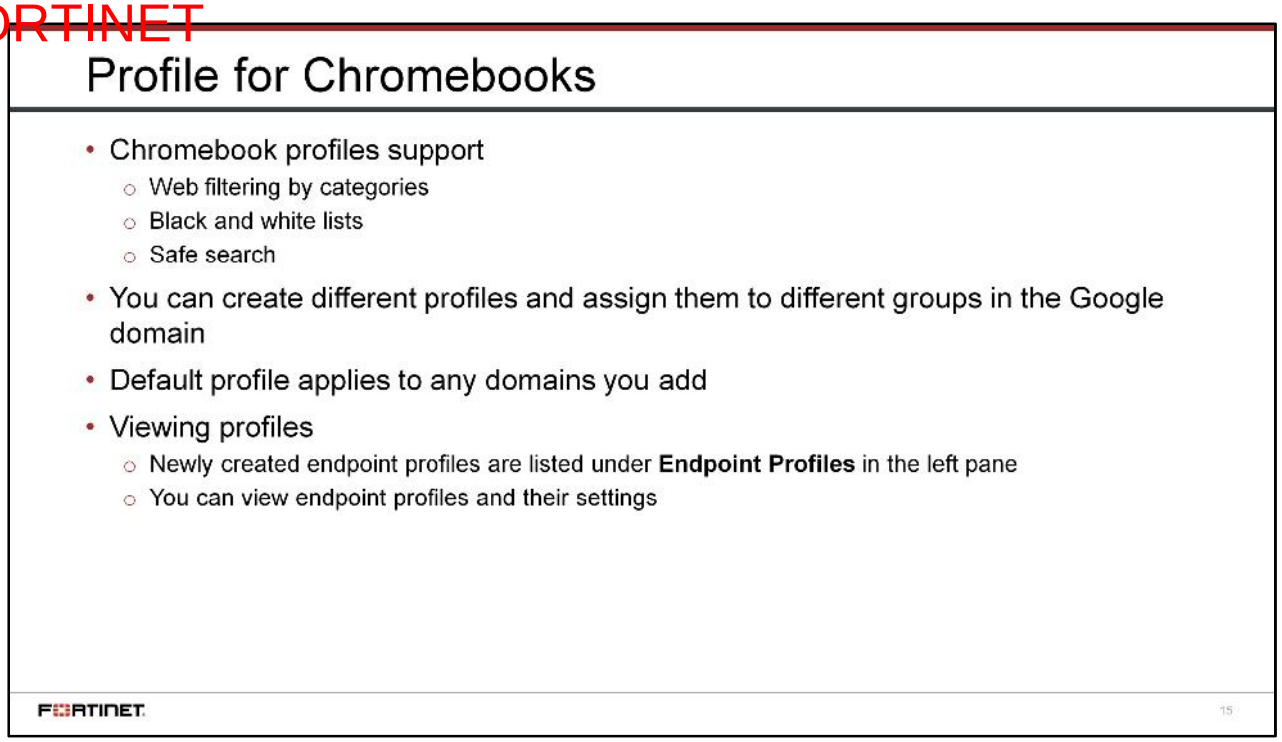


Creating profiles with XML: You can configure FortiClient profile settings in FortiClient EMS by using XML or a custom XML configuration file. The custom XML file must include all settings required by the endpoint at the time of deployment.

1. Click **Endpoint Profiles** > **Manage Profiles**, and click the **Add** button.
2. In the **Profile Name** field, enter a name for the profile.
3. Click **Advanced**. The **XML Configuration** tab opens, and the profile configuration displays in XML.
4. Click the **XML Configuration** tab, and click **Edit**.
5. Edit the XML.
6. Click **Test XML**.
7. Click **Save** to save the profile.

Creating profiles to automatically upgrade FortiClient: You can create a profile to automatically upgrade FortiClient to the latest patch release. The profile must be configured with an installer that meets the following requirements:

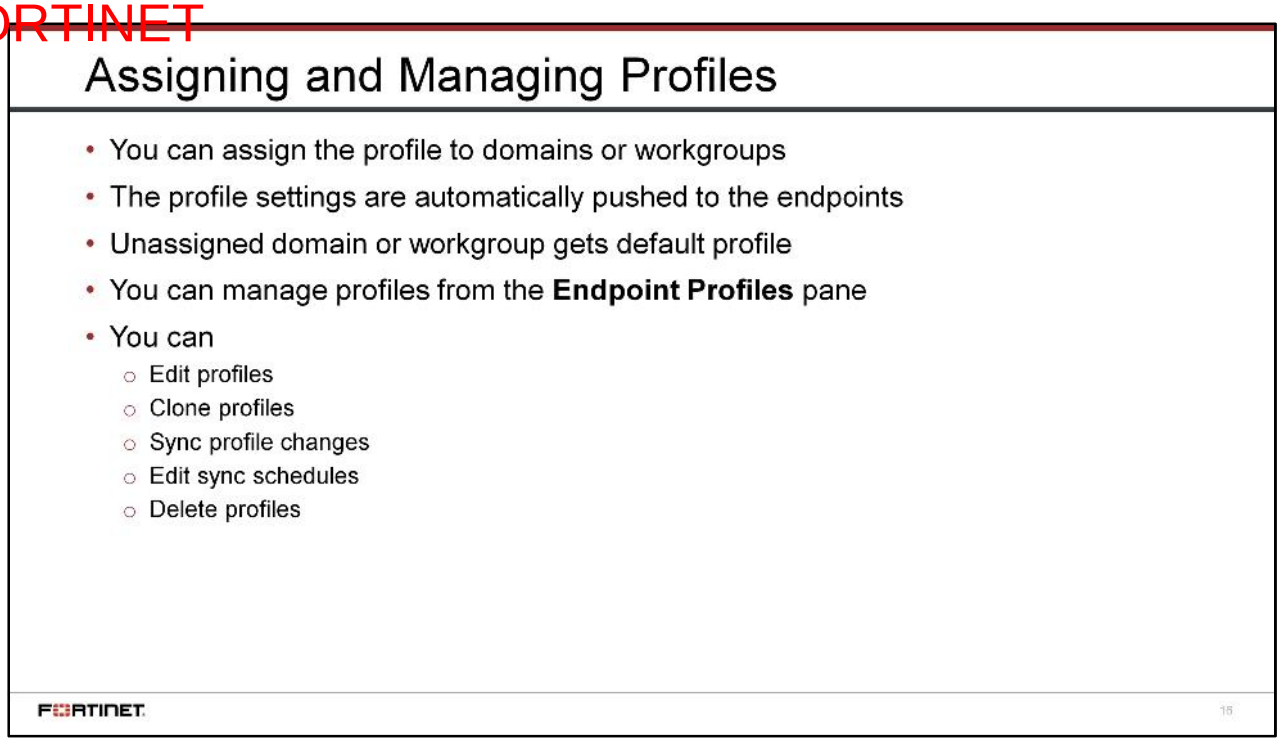
- The FortiClient installer was created in FortiClient EMS 1.2.0 or later
- The FortiClient installer was created with the latest FortiClient version available for selection in FortiClient EMS at the time the installer was created
- The FortiClient installer was created with the **Keep software updated to the latest patch release** option enabled



Chromebook profiles support web filtering by categories, black and white lists, and safe search. You can create different profiles and assign them to different groups in the Google domain. When you install FortiClient EMS, a default profile is created. This profile is applied to any domains you add to FortiClient EMS.

Enabling/disabling safe search: The search engine provides a safe search feature that blocks inappropriate or explicit images from search results. The safe search feature helps block most adult content. FortiClient EMS supports safe search for most common search engines, such as Google, Yahoo, and Bing.

The profile in FortiClient EMS controls the Safe Search feature.



Assigning profiles: After creating the profile, you can assign the profile to domains or workgroups. When you assign the profile to domains or workgroups, the profile settings are automatically pushed to the endpoints in the domain or workgroup. If you do not assign a profile to a specific domain or workgroup, the default profile is automatically applied.

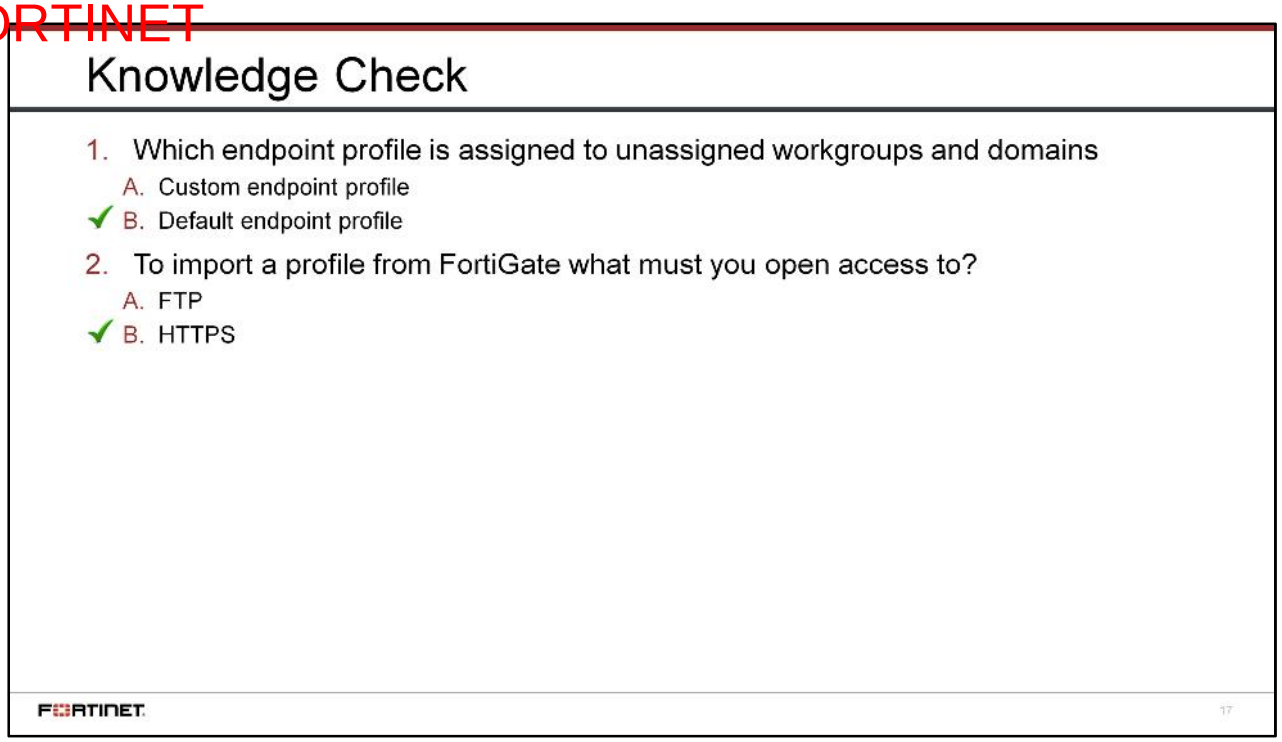
Editing profiles: When you edit a profile assigned to endpoints or domains, the changes are automatically pushed to the endpoints or Chromebooks when you save the profile.

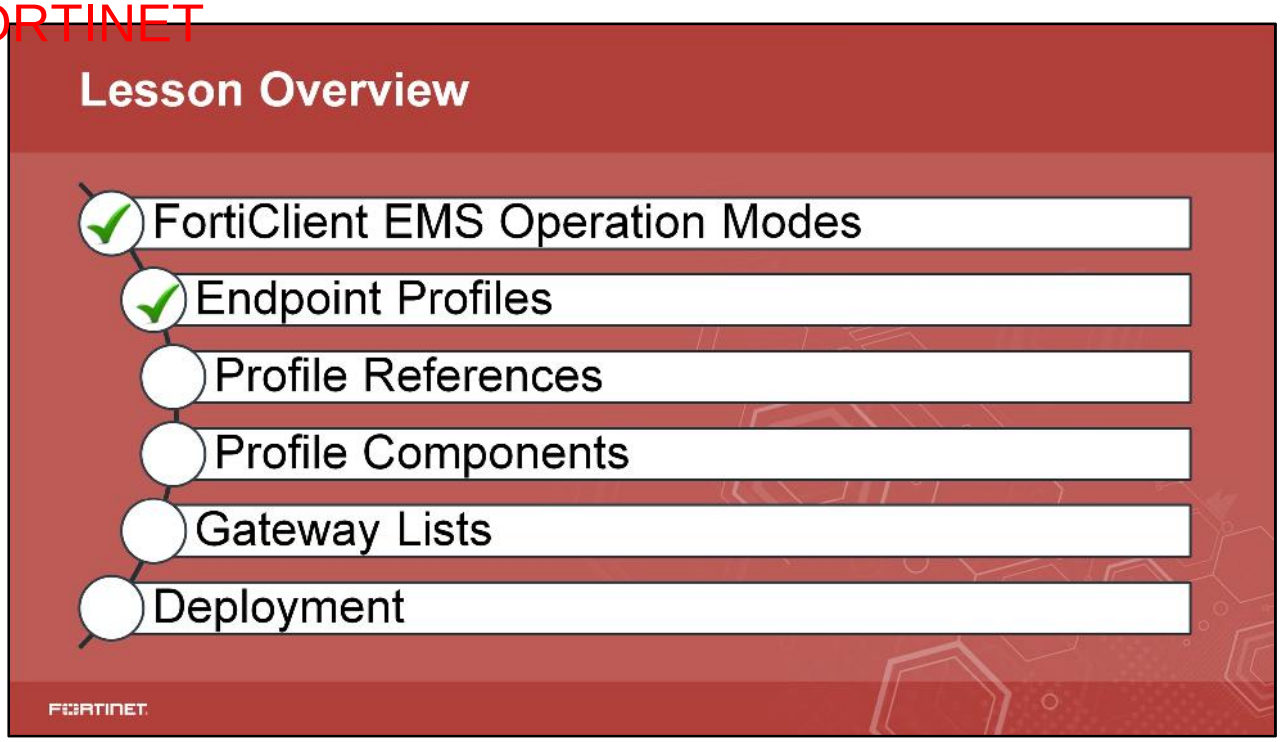
Cloning profiles: When you clone a profile, all the content displays in the content pane, and you can give new name to save it.

Syncing profile changes: For profiles imported from FortiGate or FortiManager, you can manually sync profiles so they are updated with the latest changes from the FortiGate or FortiManager they were imported from.

Editing sync schedules: For profiles imported from FortiGate or FortiManager, you can edit the sync schedule.

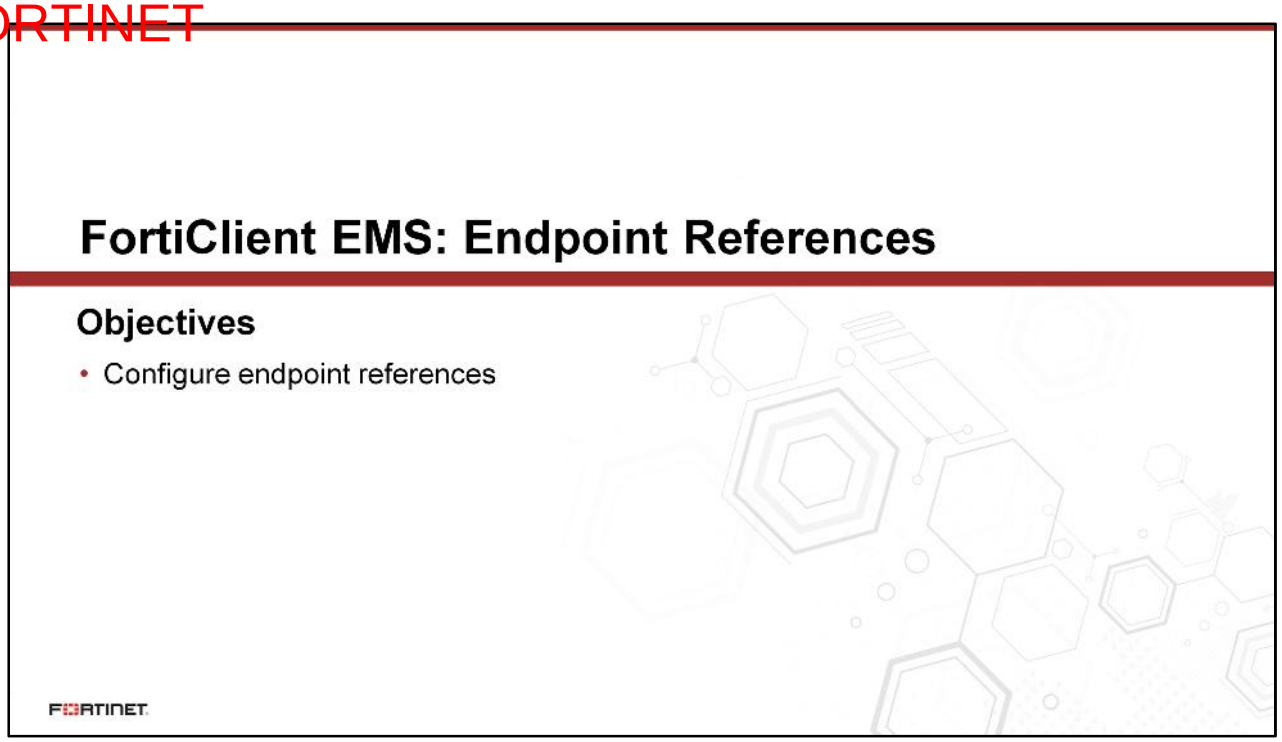
Deleting profiles: You can delete any newly created profile. But note that you cannot delete the default profile and *not* assigned profiles.





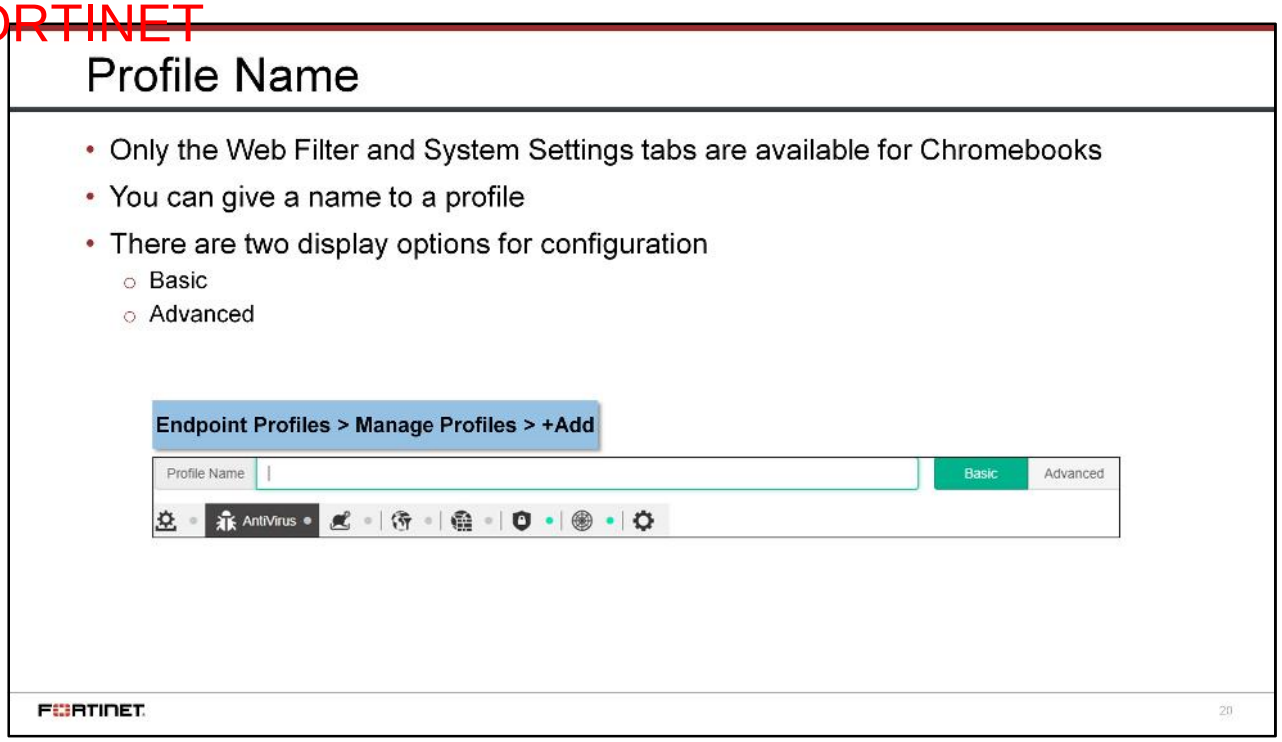
Good job! You now know how configure, edit, assign, and manage endpoint profiles.

Now, you will learn about endpoint references.



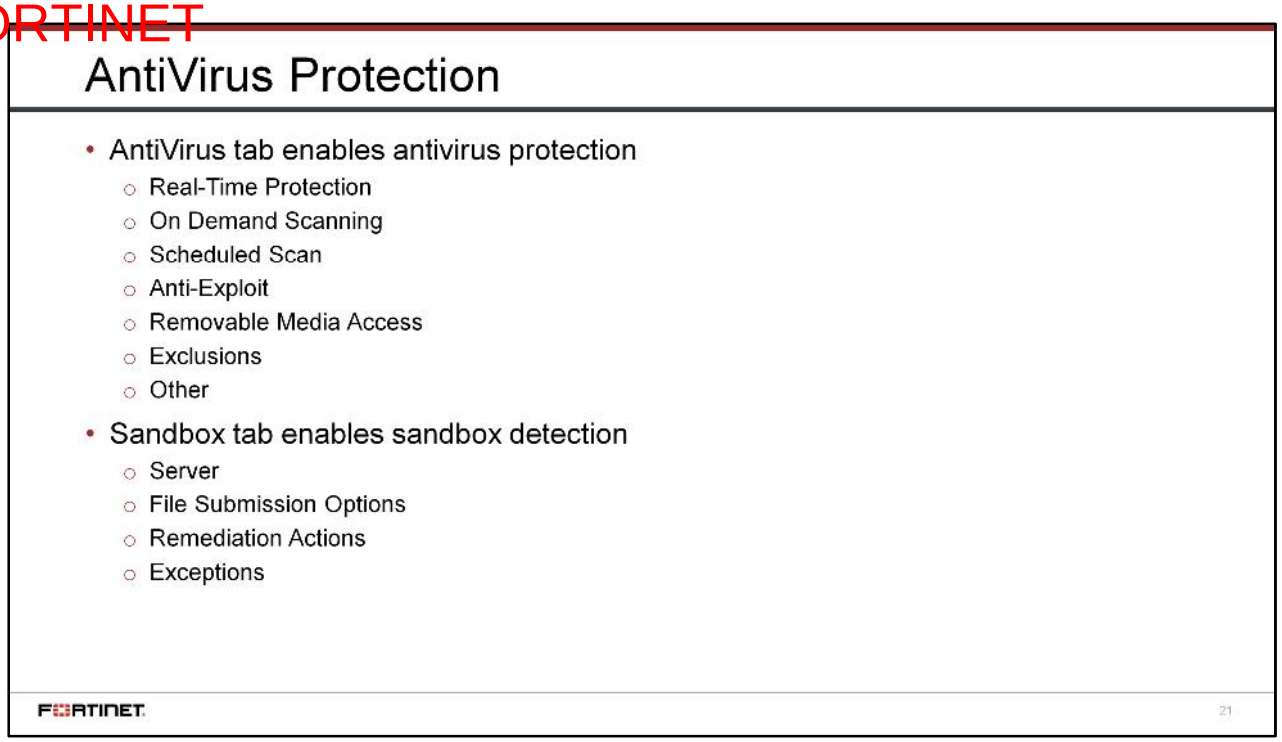
After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in configuring endpoint references, you will be able to implement the required settings to use endpoint references in your network.



For Chromebooks, only the **Web Filter** and **System Settings** tabs are available. All other tabs are exclusive to Windows, macOS, and Linux endpoints.

Profile Name: Allows you to enter a name and select a display option. **Basic** shows all the GUI options. The **Advanced** display option enables the XML configuration tab to configure a profile using XML. This option is only available for Windows, macOS, and Linux profiles.

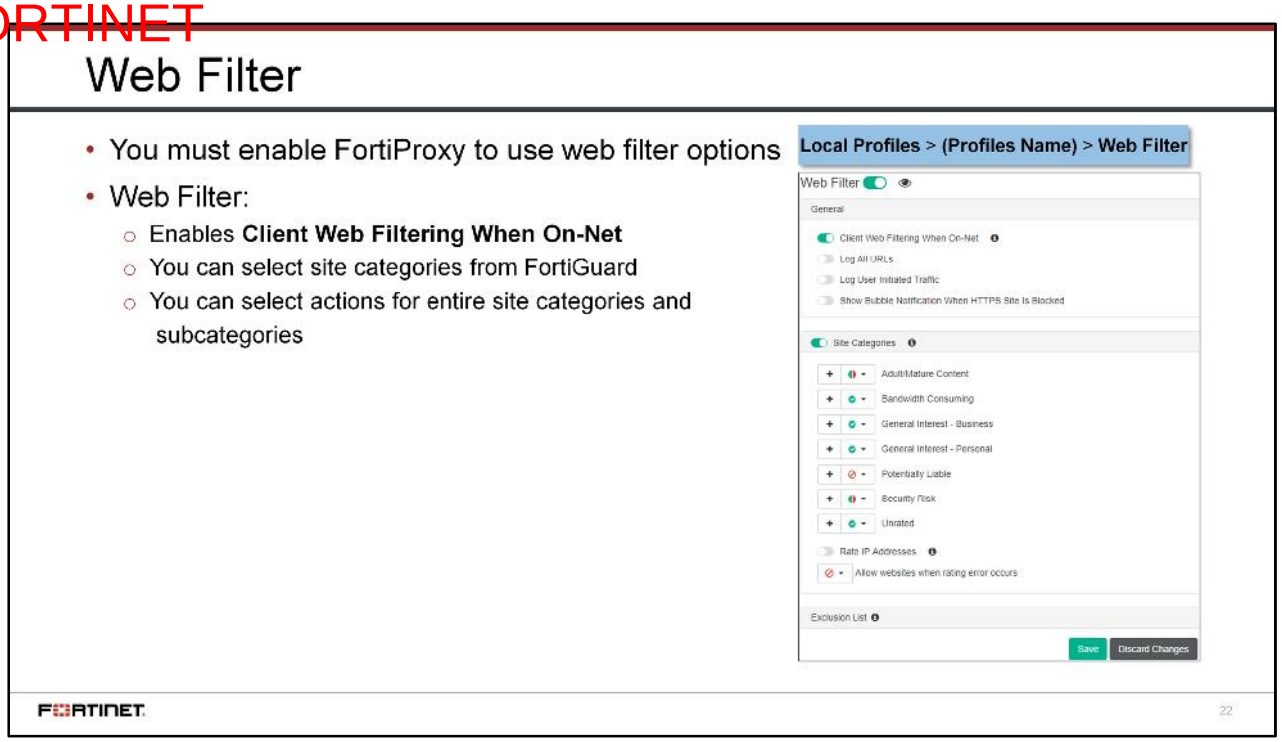


AntiVirus: Enables antivirus protection. Some options display only if you enable **Advanced**.

- **Real-Time Protection**: FortiClient can take different actions on virus discovery. It can block access to known communication channels and access to malicious websites. It also identifies malware and exploits using signatures received from FortiSandbox. This function is available only if the **Sandbox Detection** tab is available. You can also select file size and scan files accessed by a user or system process, such as Read or Write.
- **On Demand Scanning**: It integrates FortiClient into the Windows Explorer' Menu. You can enable to pause scanning when a computer is running on battery power, and automatically submit suspicious files to FortiGuard for analysis.
- **Scheduled Scan**: You can select schedule type, scan type, and priority. You can also select removable media and network drives for scanning.
- **Anti-Exploit**: Enables the anti-exploit engine to monitor commonly used applications for attempts to exploit known vulnerabilities. You can exclude applications from anti-exploit detection and enable system tray notifications.
- **Removable Media Access**: Enables controlling access to removable media devices.
- **Exclusions**: Enable exclusions from antivirus scanning.
- **Other**: Enables scan for rootkits, adware, riskware, email, media on insertion, and advanced heuristics signature.

Sandbox: Enables sandbox detection. Some options display only if you enable **Advanced**.

- **Server**: Allow to select FortiSandbox in the network. You can select file access options based on results.
- **File Submission Options**: You can select file resources like removable media, network drives, web downloads, and email downloads.
- **Remediation Actions**: Select **Quarantine** or **Alert & Notify** for infected files.
- **Exceptions**: You can exclude files from trusted sources and specific files or folders.



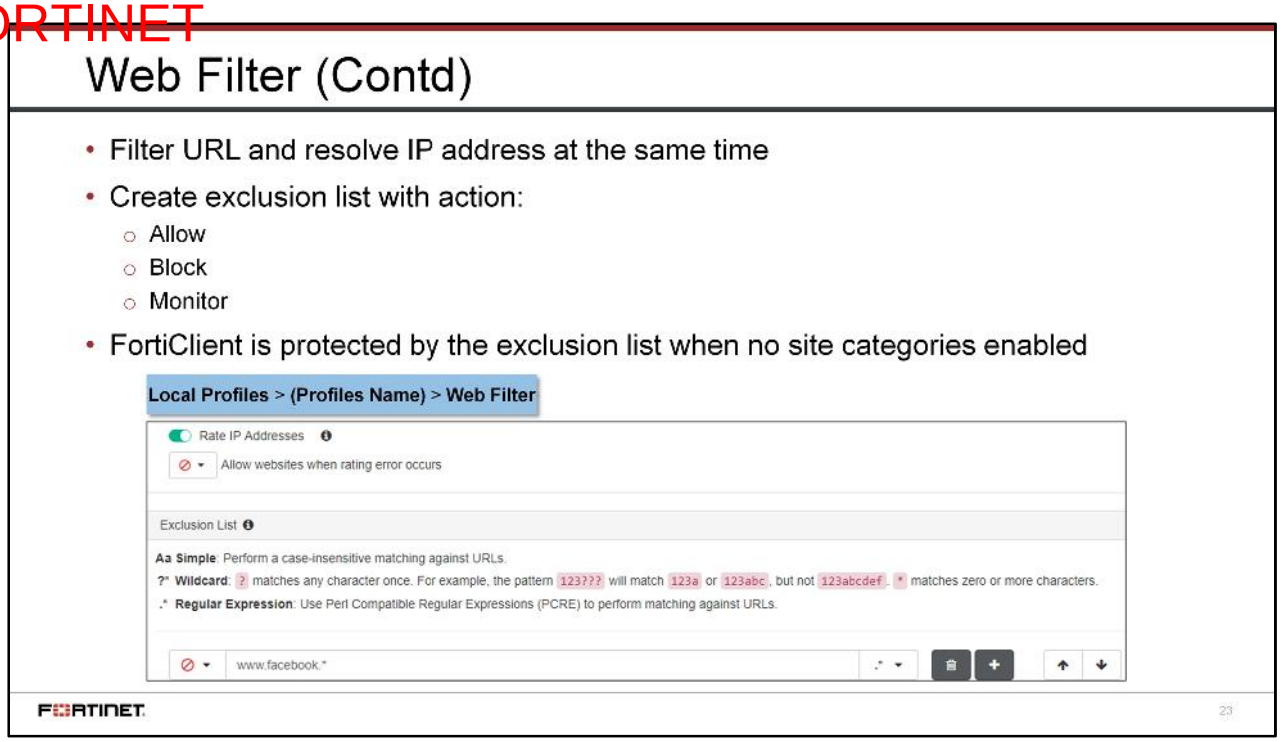
Web Filter: Enables web filtering options. For Windows, macOS, and Linux profiles, you must enable **FortiProxy (Disable Only When Troubleshooting)** on the **System Settings** tab to use the **Web Filter** options.

General:

- **Client Web Filtering When On-Net**: FortiClient does web filtering even when it's On-net with FortiGate in the network also configured with web filter profile. This is only available for Windows and macOS profiles. This setting affects the **Block Access to Malicious Websites** setting in AntiVirus protection.
- **Log All URLs**: Enables logging for all URLs.
- **Log User Initiated Traffic**: Includes user information in web filtering logs.
- **Show Bubble Notification When HTTPS Site Is Blocked**: Enables the showing of a bubble notification when HTTPS site is blocked
- **Save Search**: You can enable safe search option for search engines like Google search or YouTube.

Site Categories: Enables site categories from FortiGuard. When site categories are disabled, FortiClient is protected by the exclusion list. For all categories below, you can configure an action for the entire site category by selecting either **Block**, **Warn**, **Allow**, or **Monitor**. Each site category is listed below:

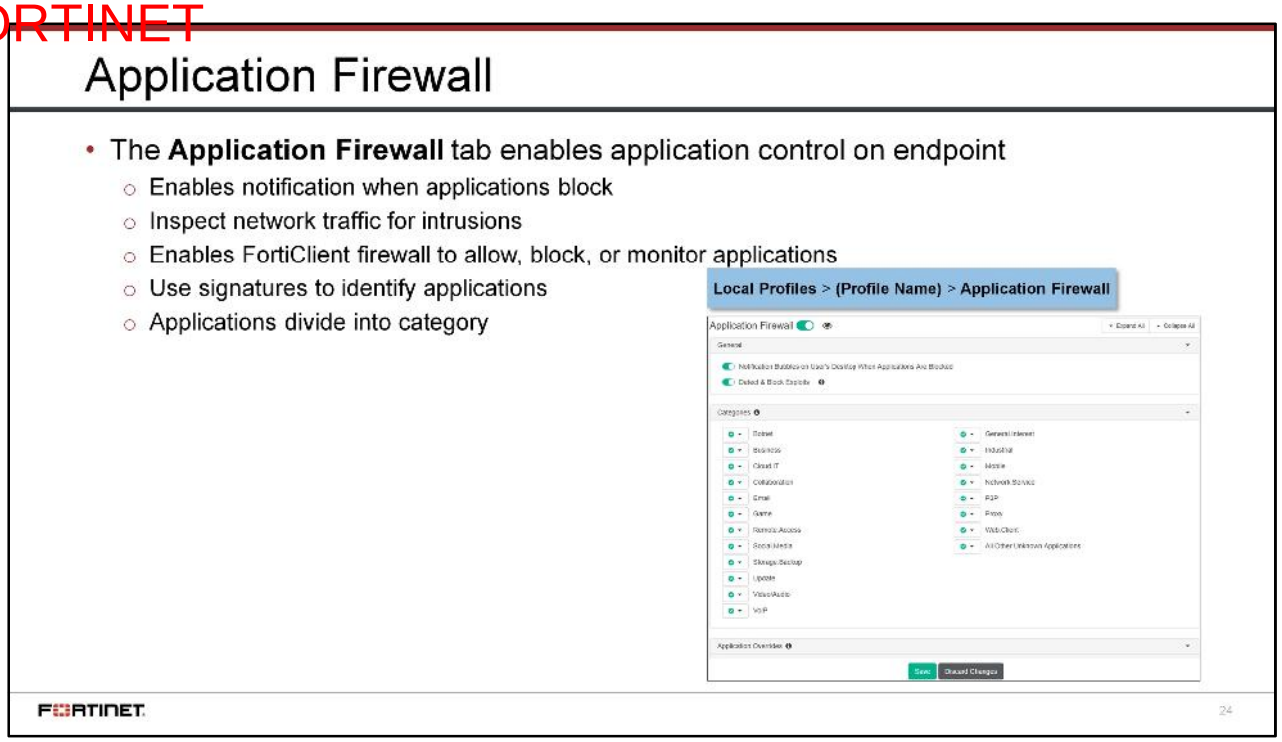
- **Adult/Mature Content**
- **Bandwidth Consuming**
- **General Interest-Business**
- **General Interest-Personal**
- **Potentially Liable**
- **Security Risk**
- **Unrated**



Rate IP Addresses: You can also filter URLs and resolved IP addresses at the same time and select the action for rating errors.

Note that if the **Allow websites when rating error occurs** option is enabled, FortiClient will block all URLs, including the captive-portal authentication page. This will prevent users from getting access to the authentication page.

Exclusion List: You can select an action, and enter specific URLs and their type, such as simple, wildcard, or regular expression.

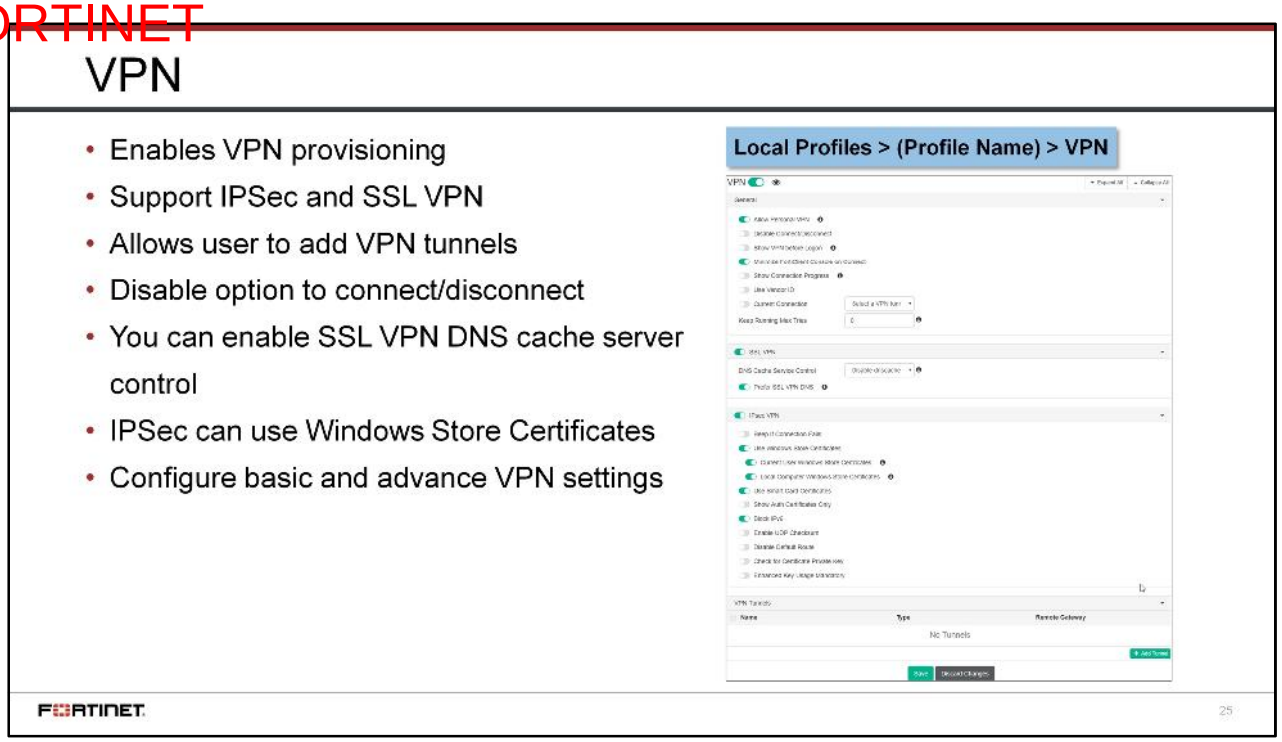


Application Firewall: Use this switch to enable or disable application control.

- **General**: You can enable bubble notifications for block applications. You can also enable to inspect network traffic for intrusions attempting to exploit known vulnerabilities.

- **Categories**: You can take different actions on these categories:
  - **Botnet**, **Business**
  - **Cloud.IT**, **Collaboration**
  - **Email**
  - **Game**, **General.Interest**
  - **Industrial**
  - **Mobile**, **Network.Service**
  - **P2P**, **Proxy**
  - **Remote.Access**
  - **Social.Media**, **Storage.Backup**
  - **Update**
  - **Video/Audio**, **VoIP**
  - **Web.Others**
  - **All Other Unknown Applications**

- **Application Overrides**: Enable FortiClient firewall to *allow*, *block,* or *monitor* applications based on their signature. You can delete an application and add a signature to an application.



Use the settings on the **VPN** tab enable or disable VPN use on endpoints. There are general and specific VPN type settings available to configure.

General: You can enable or disable **Allow Personal VPN**, **Disable Connect/Disconnect**, **Show VPN before Logon**, **Minimize FortiClient Console on Connect**, **Show Connection Progress**, **Use Vendor ID and Current Connection**. You can also select a maximum number of attempts.

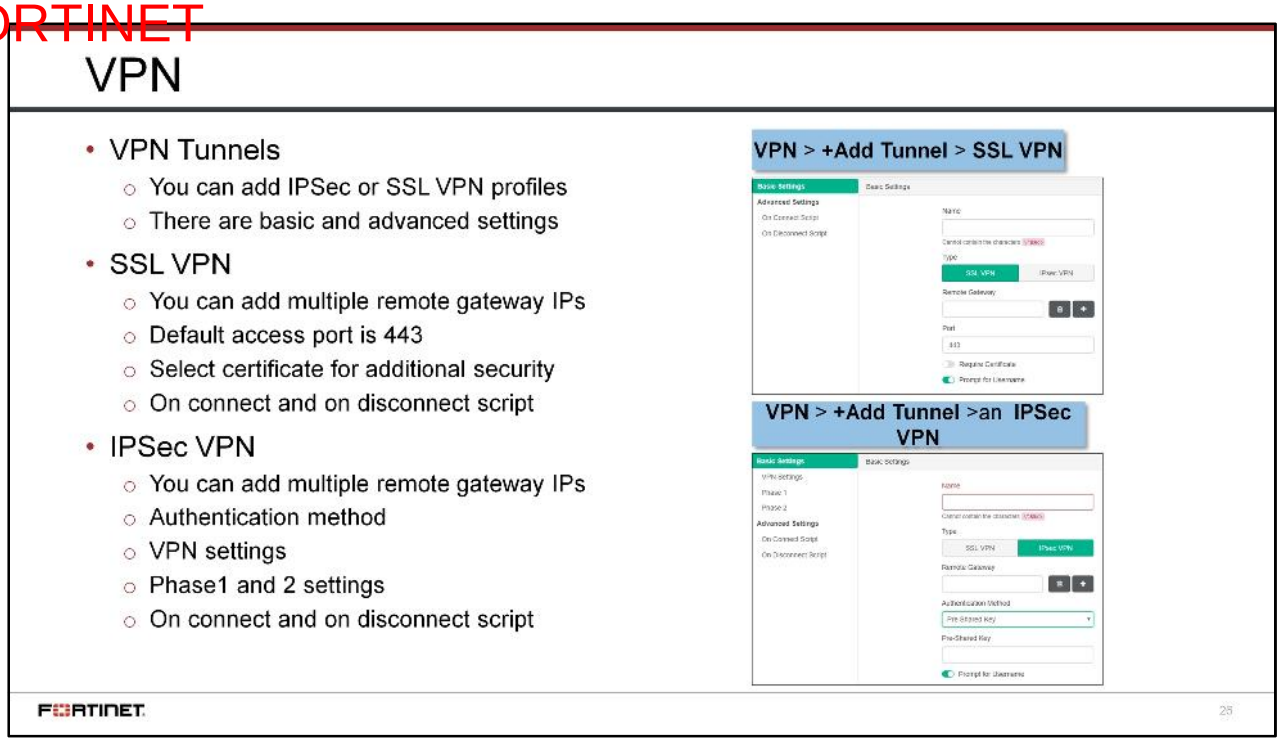
SSL VPN: The options in the **DNS Cache Service Control** are:

- **Disable dnscache service**
- **Leave dnscache service unchanged**
- **Restart dnscache service**
- **Restart dnscache service with SC command**

You can also override DNS server to SSL VPN DNS IP.

IPSec VPN: Enable or disable the following:

- **Beep If Connection Fails**
- **Use Windows Store Certificates**
- **Current User Windows Store Certificates (IPsec only)**
- **Local Computer Windows Store Certificates (IPSec only)**
- **Use Smart Card Certificates**
- **Show Auth Certificates Only**
- **Block IPv6**
- **Enable UDP Checksum**
- **Disable Default Route**
- **Check for Certificate Private Key**
- **Enhanced Key Usage Mandatory**

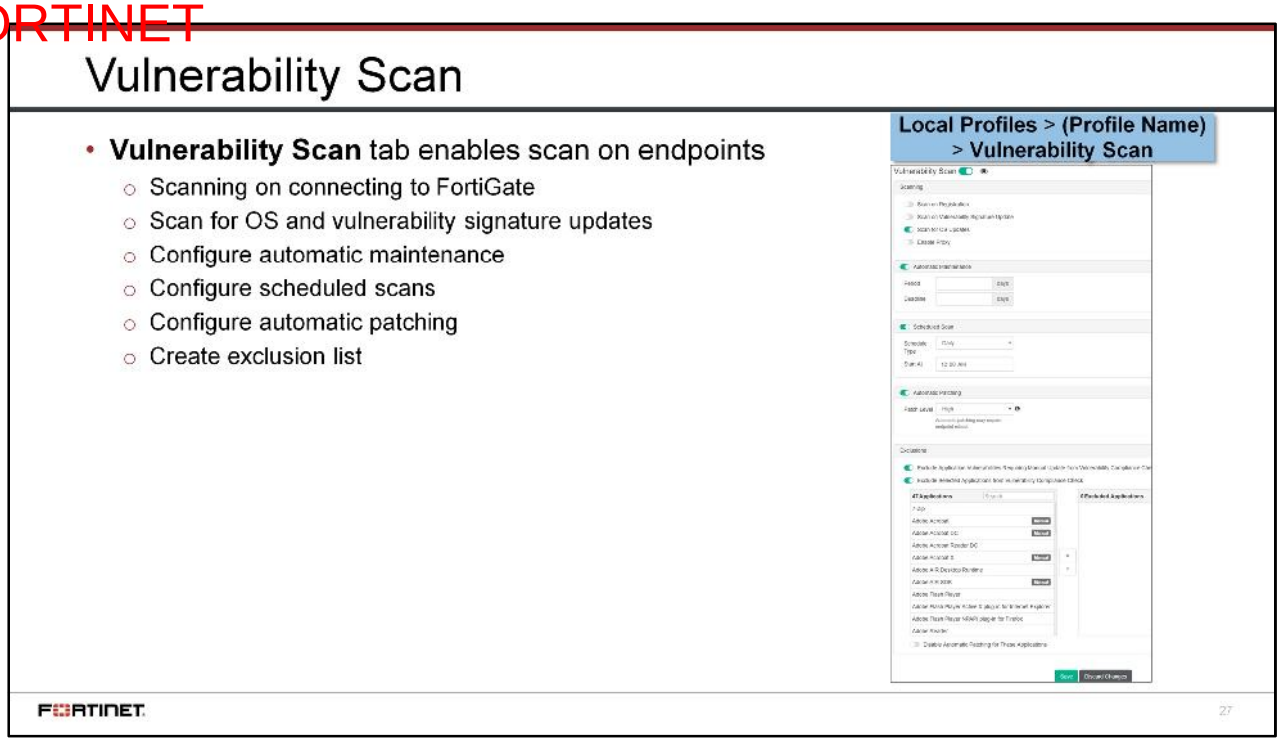


You can add VPN profiles both SSL and IPsec.

SSL VPN: The SSL settings includes remote gateway IP, SSL port number, an options to request the certificate and prompt for user name. There is also option to enter connect and disconnect scripts, which also an needs to be enabled on the FortiGate.

IPSec VPN: The following options are available when you select IPSec VPN:

- **General**: It includes remote gateway IP, authentication method, pre-shared key (if **Pre-Shared Key** is selected for **Authentication Method**) and prompt username.
- **VPN Settings**: It includes the following:
  - IPSec mode: Select **Main** or **Aggressive**
  - Options: Select **Mode Config**, **Manual Set**, or **DHCP over IPSec**.
  - DNS Server: Specify DND server for the VPN tunnel if **Manual Set** is selected.
  - Assign IP Address: Enter IP address to assign to tunnel. Available for **Manual Set**.
  - Split Table: Enter IP address and subnet mask for the VPN tunnel. Available for **Manual Set** or **DHCP over IPSec**.
- **Phase 1**: Select the encryption and authentication algorithms used to generate keys for protecting negotiations and add encryption and authentication algorithms as required. You need to select a minimum of one and a maximum of two combinations. The remote peer or client must be configured to use at least one of the proposals that you define.
- **Phase 2**: Select the encryption and authentication algorithms that will be proposed to the remote VPN peer. You can specify up to two proposals. To establish a VPN connection, at least one of the proposals that you specify must match the configuration on the remote peer.



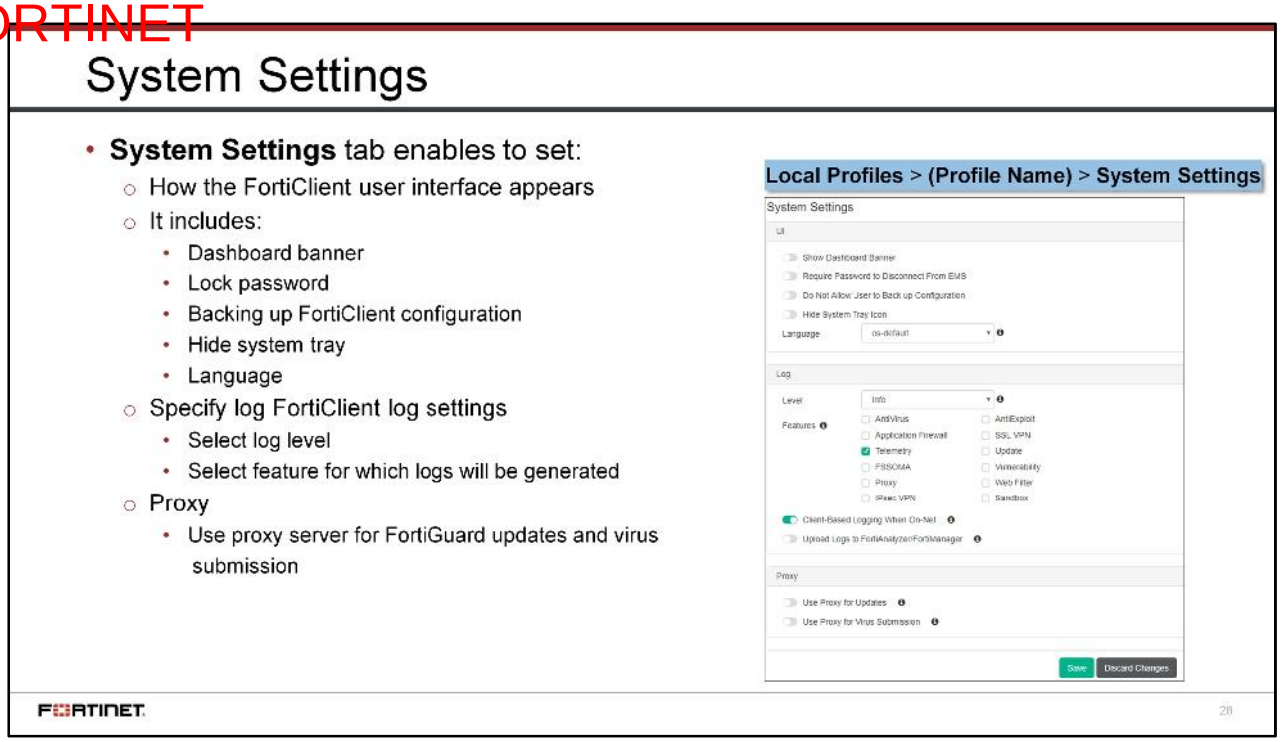
Scanning:
- **Scan on Registration**: Scan endpoints upon connecting to a FortiGate.
- **Scan on Vulnerability Signature Update**: Scan endpoints upon updating a vulnerability signature.
- **Scan for OS**: Updates scan for OS updates.
- **Enable Proxy**: Enable proxy.

Automatic Maintenance: Configure settings for automatic maintenance. This configures the vulnerability scan to run as part of Windows automatic maintenance. Adding FortiClient vulnerability scans to the Windows automatic maintenance queue allows the system to choose an appropriate time for the scan.

Scheduled Scan: Configure settings for scheduled scanning. In the **Schedule Type** drop-down list you can select **Daily**, **Weekly**, or **Monthly**. In the **Scan On** field, you can configure the day the scan will run. This setting applies if the schedule is *Monthly*. You can also specify the time the scan will start.

Automatic Patching: When enabled, patches are installed automatically when vulnerabilities are detected. Select one of the following:
- **Critical**: Patch critical vulnerabilities only.
- **High**: Patch high severity, and above, vulnerabilities.
- **Medium**: Patch medium severity, and above, vulnerabilities.
- **Low**: Patch low severity, and above, vulnerabilities.
- **All**: Patch all vulnerabilities.

Exclusions:
- **Exempt Application Vulnerabilities Requiring Manual Update from Vulnerability Compliance Check.** This option does not exclude applications from vulnerability scanning.
- **Exclude Selected Applications from Vulnerability Compliance Check**



The majority of these configuration options are only available for Windows, macOS, and Linux profiles. Some options are available for Chromebook profiles, such as **Upload Logs to FortiAnalyzer/FortiManager**. Some options are available only when **Advanced** view is enabled.

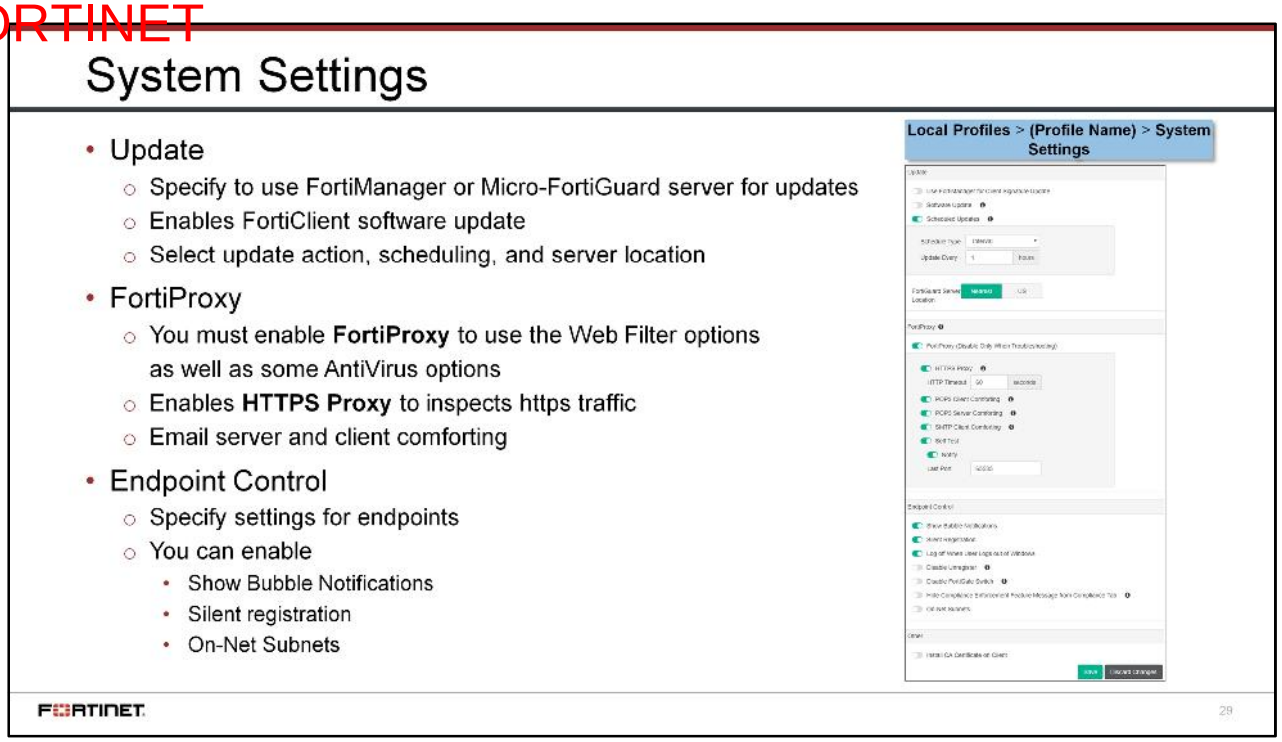
UI: Specifies how the FortiClient user interface appears when installed on endpoints.

Log: Specifies log settings such as **Level** and **Features** for which logs will generate:

- **Disabled**
- **Emergency**: The system becomes unstable.
- **Alert**: Immediate action is required.
- **Critical**: Functionality is affected.
- **Error**: An error condition exists and functionality could be affected.
- **Warning**: Functionality could be affected.
- **Notice**: Information about normal events.
- **Info**: General information about system operations.
- **Debug**: Debug FortiClient.

You can also select **Client-Based Logging When On-Net** and **Upload Logs to FortiAnalyzer/FortiManager**.

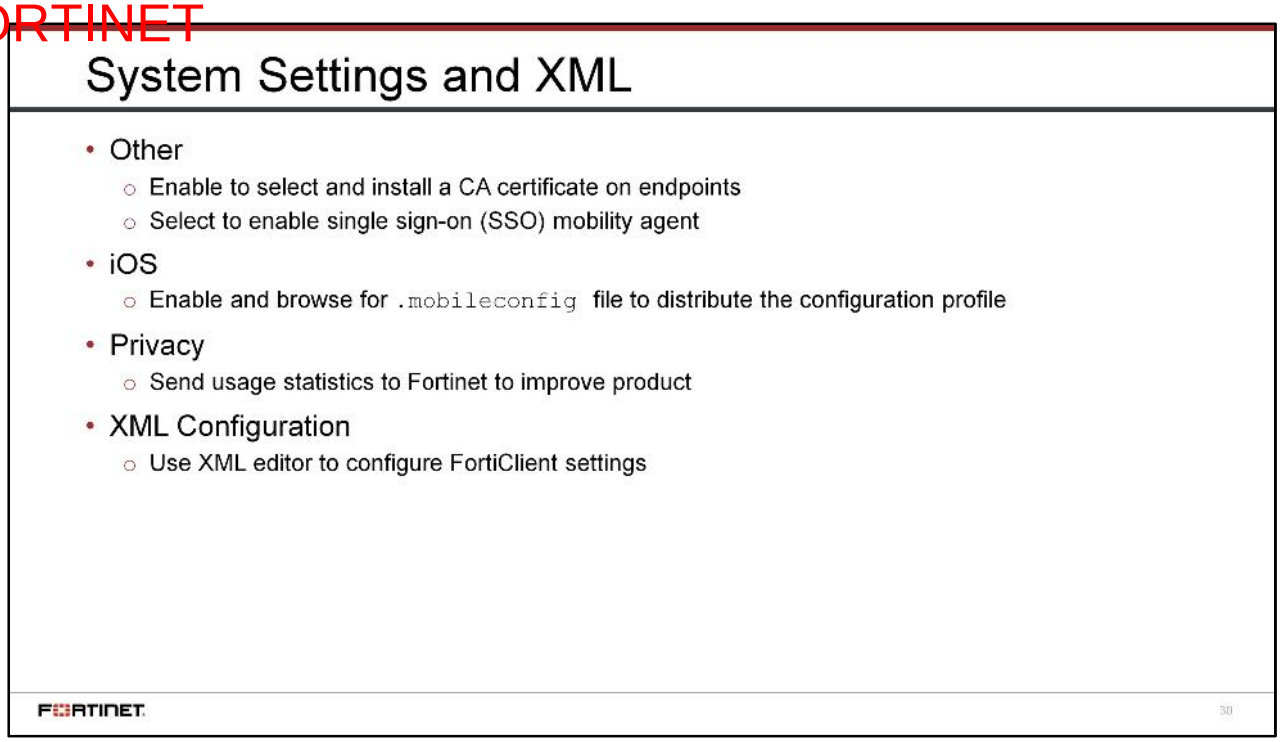
Proxy: Enable to access FortiGuard and submit virus to FortiGuard using the configured proxy. You can select proxy type, IP, port, username, and password.



Update: You can specify to use FortiManager or Micro-FortiGuard Server for FortiClient updates. You can also select FortiClient software updates, the update schedule, and FortiGuard server location.

FortiProxy: Enable **FortiProxy (disable only when troubleshooting)**. You must enable FortiProxy to use the Web Filter options as well as some AntiVirus options. You can enable **HTTPS Proxy**. If disabled, FortiProxy no longer inspects HTTPS traffic. It also enables **HTTP Timeout**, **POP3 Client Comforting**, **POP3 Server Comforting**, **SMTP Client Comforting**.

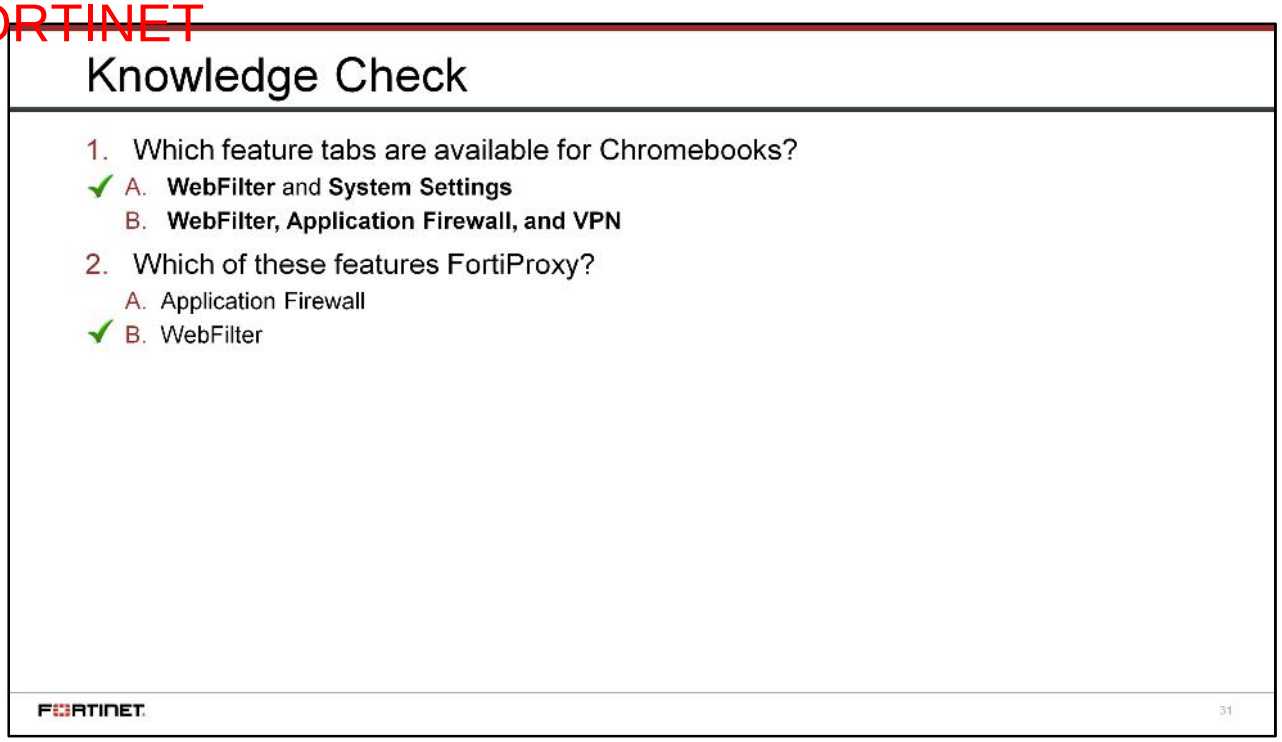
Endpoint Control: Specify the settings for endpoint such as:
- **Show Bubble Notifications**
- **Show Profile Details**
- **Silent Registration**
- **Log off When User Logs Out of Windows**
- **Disable Unregister**
- **Hide Compliance Enforcement Feature Message from Compliance Tab**
- **On-Net Subnets**

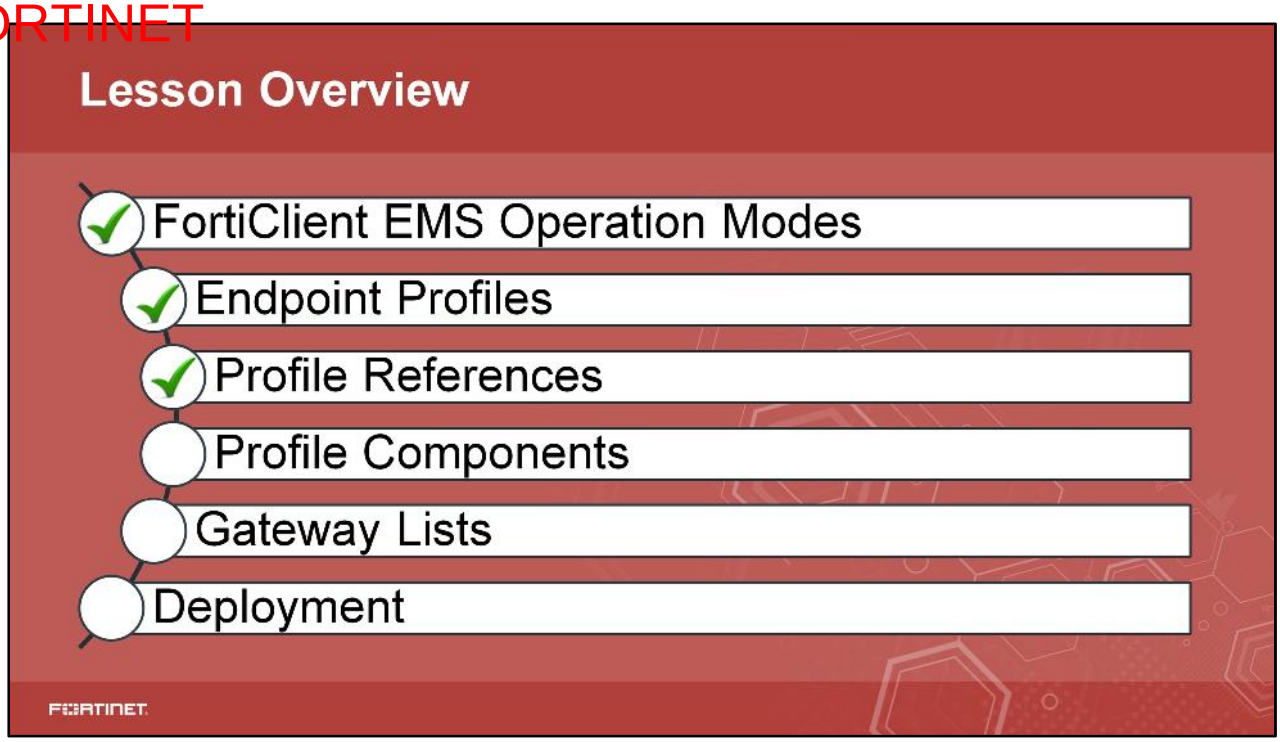


Other: Enable to install CA certificate on client, you can add certificates by clicking **Profile Components** > **Manage CA Certificates**. It also enables SSO mobility Agent for FortiAuthenticator. To use this feature you need to apply a FortiClient SSO mobility agent license to your FortiAuthenticator device.

iOS: Select this to enable and browse for your `.mobileconfig` file to distribute the configuration profile.

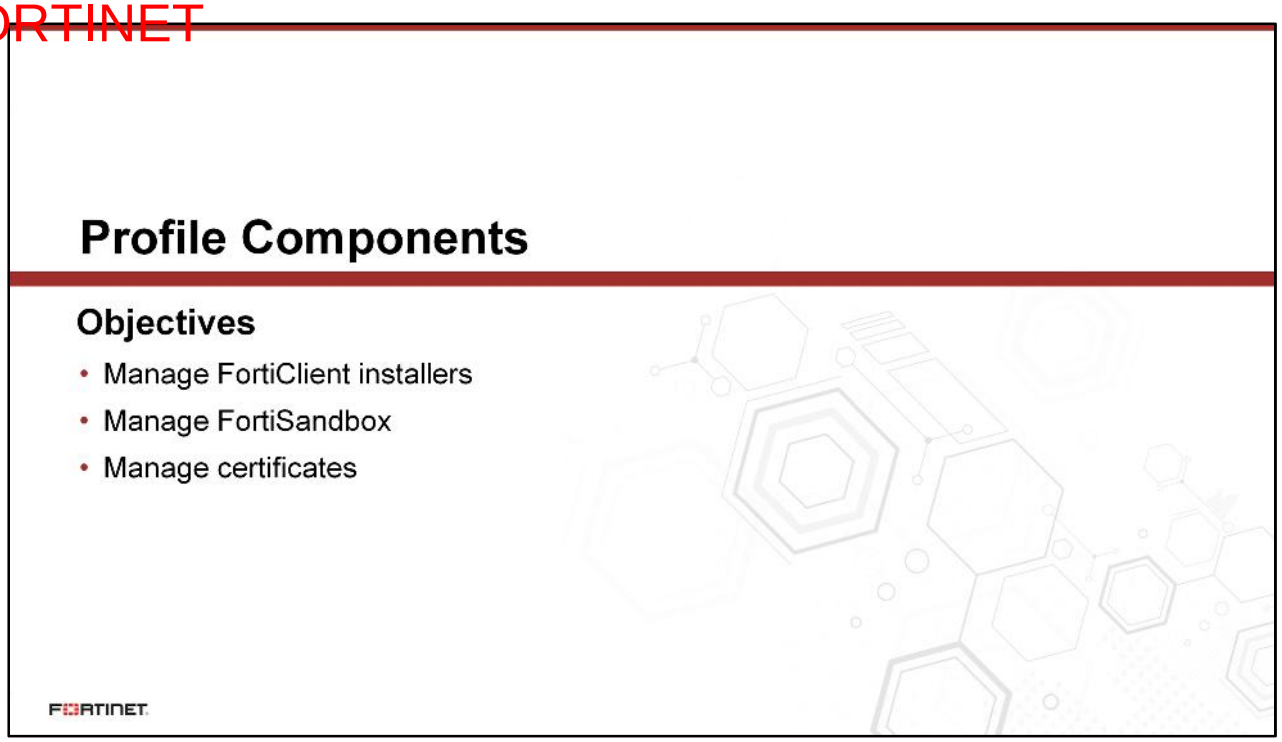
XML Configuration: Use XML editor to configure FortiClient options and settings.





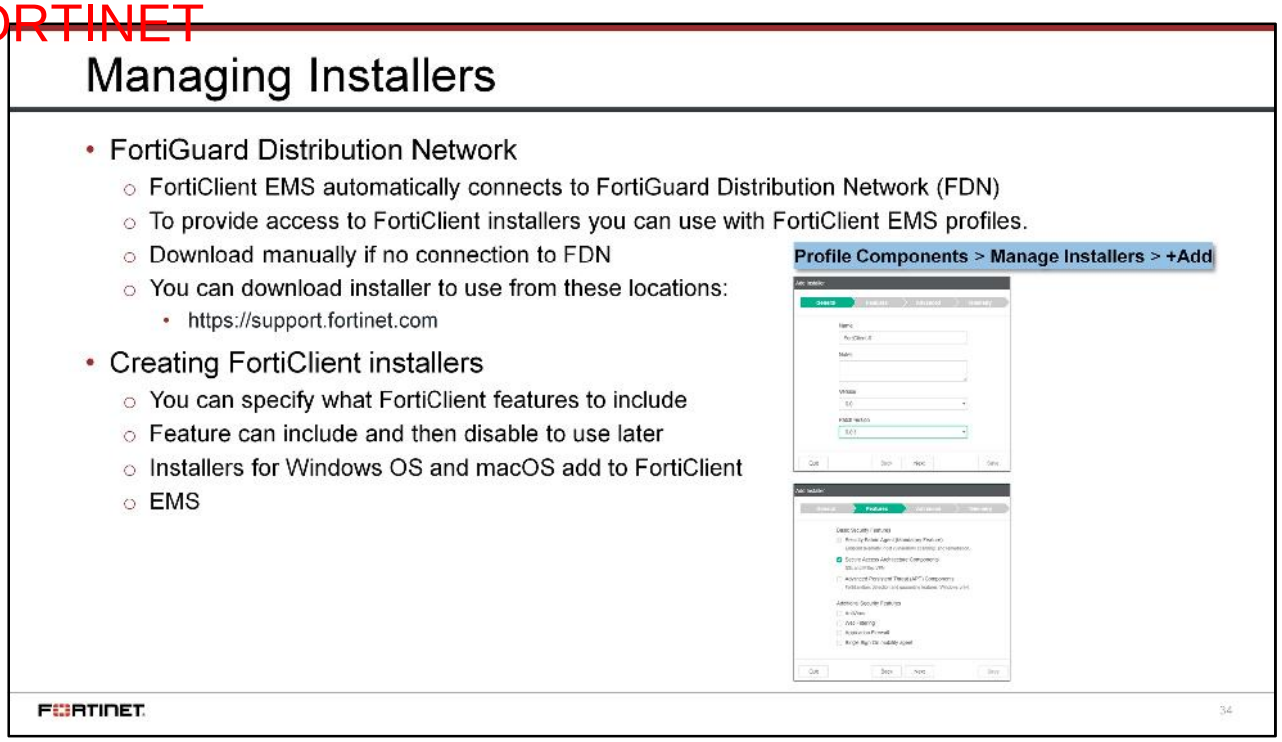
Good job! You now understand how to use endpoint references.

Now, you will learn about profile components.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in working with profile components, you will be able to manage installers, FortiSandbox, and certificates.



FortiClient EMS automatically connects to FDN to provide access to FortiClient installers that you can use with FortiClient EMS profiles. If a connection to FDN is not available, you must manually download FortiClient installers to use with FortiClient EMS.

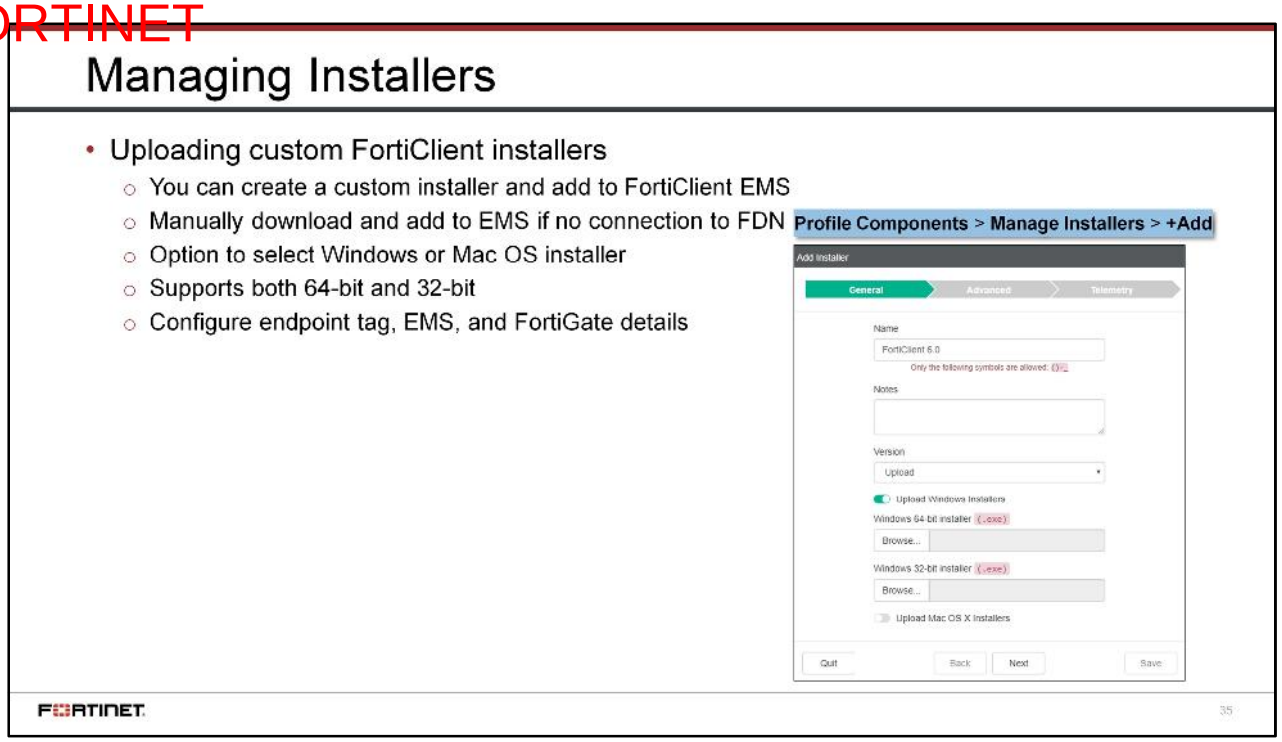
You can download FortiClient installers to use with FortiClient EMS from the following locations:

- https://support.fortinet.com

You can specify what FortiClient features to include in the installer for the endpoint. You can include a feature in the installer, then disable the feature in the profile. Because the feature is included in the installer, you can update the profile later to enable the feature on the endpoint. When you create a FortiClient installer in FortiClient EMS, an installer for the Windows operating system and an installer for the macOS operating system are added to FortiClient EMS. You can also select **Advanced Options** such as automatic registration, desktop shortcut, start menu and endpoint tag.

Fortinet does not recommend to install webfilter and application firewall features on Windows server OS.

Note that after you add a FortiClient installer to FortiClient EMS, you cannot edit it. You can delete the installer from FortiClient EMS, and edit the installer outside of FortiClient EMS. You can then add the edited installer to FortiClient EMS.



You can create a custom FortiClient installer and add it to FortiClient EMS. Alternately, if a connection to FDN is not available, you may need to manually download a FortiClient installer and add it to FortiClient EMS. Select **Upload** in **Add Installer** dialog box in the **Version** list.

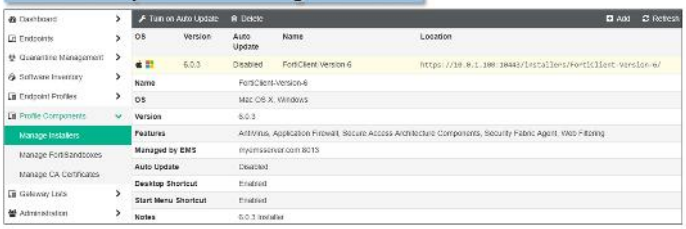
There are options to select Windows or MacOS and 64-bit or 32-bit installer for Windows OS. In the **Advanced** tab, you also select endpoint tag, EMS, and FortiGate. For FortiGate and endpoint tag, a gateway list and endpoint tag must have configured.

The online installer available for download at `FortiClient.com` cannot be uploaded into the **Add Installer** dialog in **Manage Installers**.

Managing Installers

- You can view on the Manage Installers pane after you add them on EMS
- Profile Components > Manage Installers displays:
  - Available Installer
  - View Details
  - Turn on/off Auto Update
  - Add
  - Refresh
- You can delete an installer by selecting it and clicking Delete

Profile Components > Manage Installers



FORTINET

After you add FortiClient installers to FortiClient EMS, you can view them on the **Manage Installers** pane. The **Manage Installers** displays the available installer list, name of installer, OS, FortiClient version, enabled features and other related information about installer.

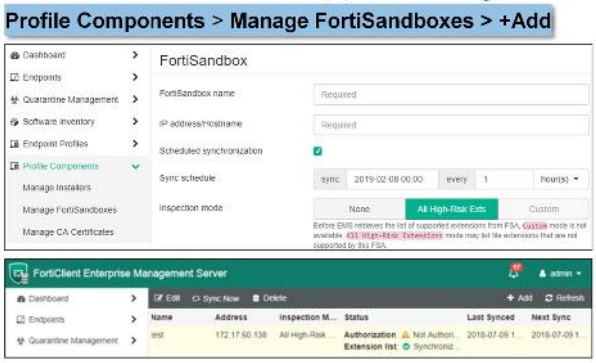
You can also enable or disable auto update. When auto update is enabled, FortiClient EMS automatically keeps the installer updated to the latest patch.

To delete a FortiClient installer, do the following:

- Click **Profile Components** > **Manage Installers**.
- Click the desired installer, then click **Delete**.
  A confirmation dialog box opens.
- Click **Yes**.
  The FortiClient installer is deleted from FortiClient EMS.

Managing FortiSandbox Units

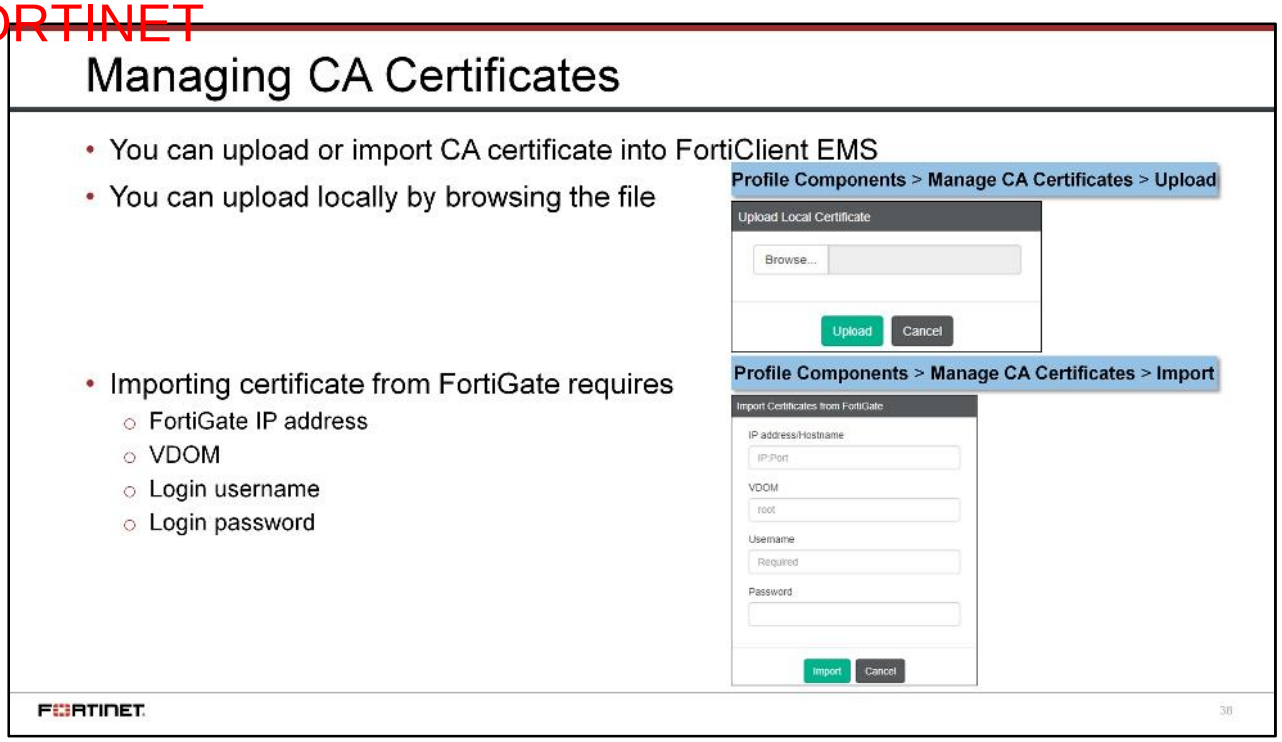
- You can add, view, and edit FortiSandbox units on the **Manage FortiSandboxes** pane
- Configure a synchronization schedule between EMS and FortiSandbox
- FortiClient EMS detects FortiSandbox units from the **Sandbox Detection** tab
- You can also delete FortiSandbox unit(s) on **Manage FortiSandboxes** pane



On the **Manage FortiSandboxes** pane, you can add, view, and edit FortiSandbox units, including configuring the synchronization schedule between FortiClient EMS and FortiSandbox. FortiSandbox units configured on the **Manage FortiSandboxes** pane can be selected from the **Sandbox Detection** tab when creating or editing an endpoint profile.

To delete a FortiSandbox device, do the following:
1. Click **Profile Components** > **Manage FortiSandboxes**.
2. Select the desired FortiSandbox.
3. Click **Delete**.
4. Click **Yes**.

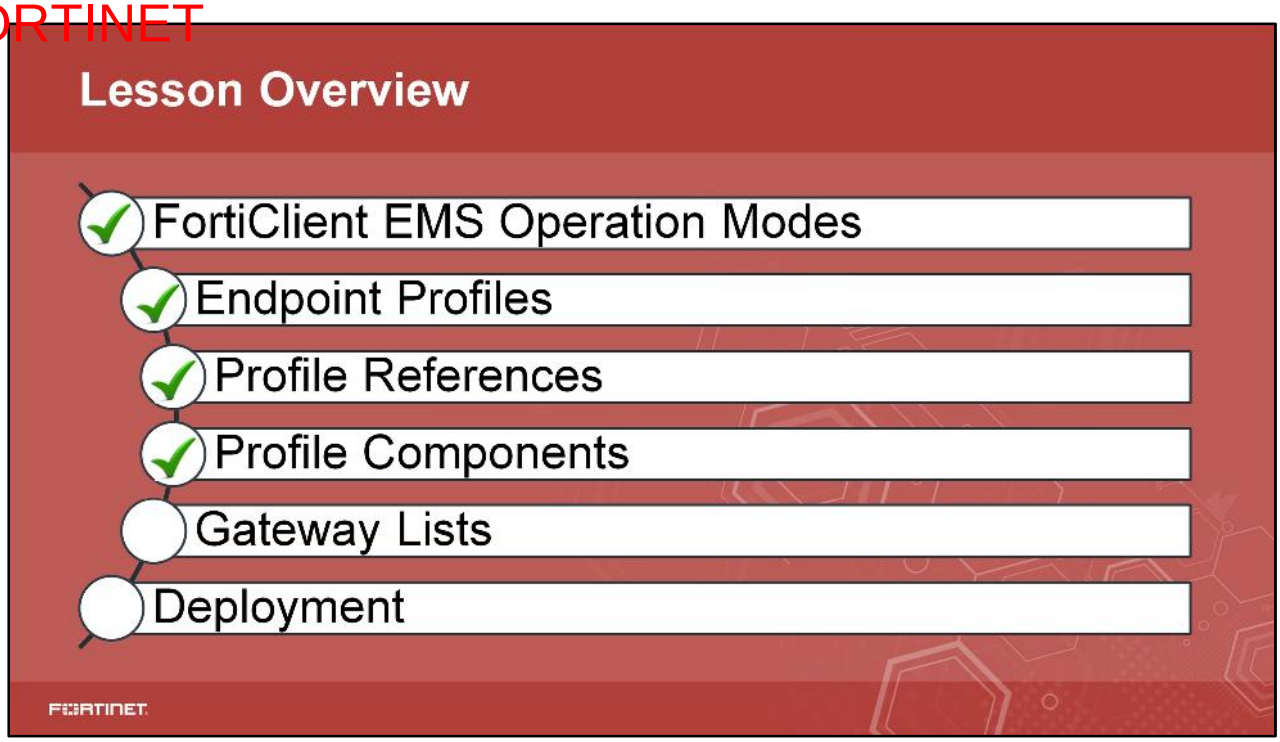
Note that you can delete the profile only if it is not assigned to or used in an endpoint profile.



You can upload or import CA certificates into FortiClient EMS. You can upload CA certificates locally. To import a certificate from FortiGate, you need FortiGate's login details.

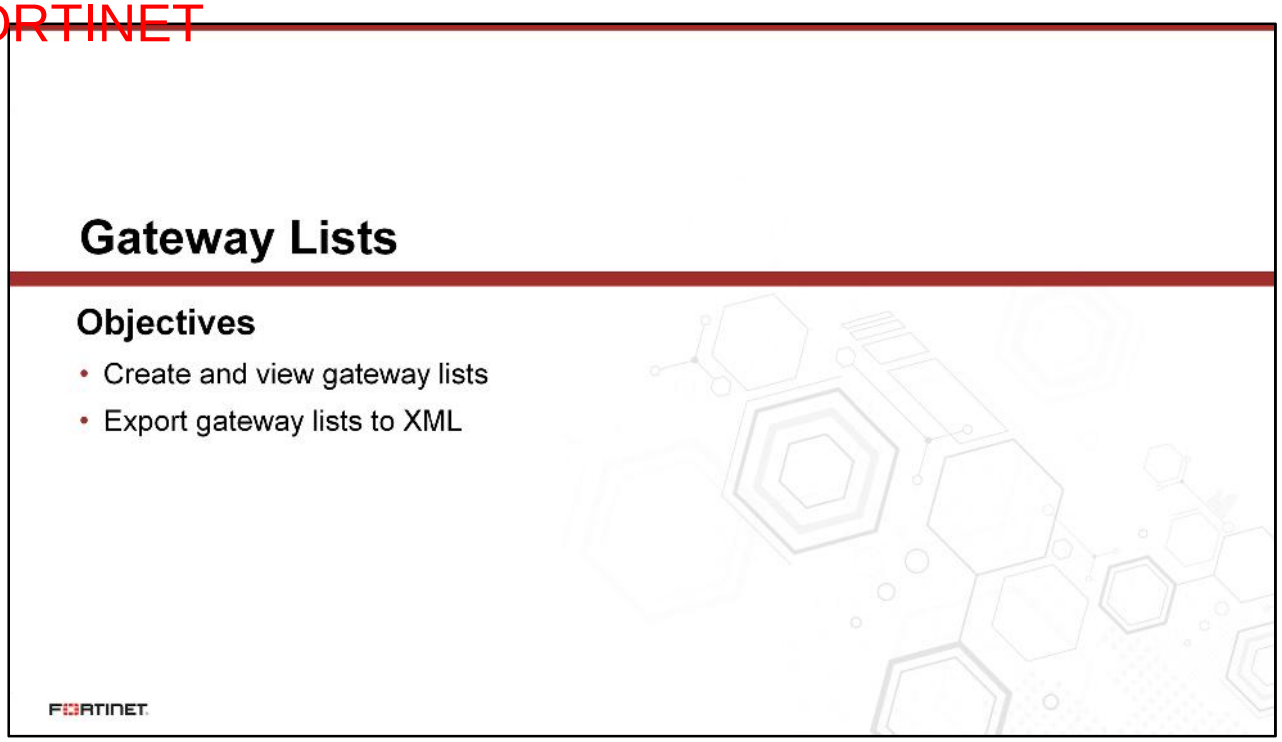
Knowledge Check

1. By what method can you add a custom installer to FortiClient EMS?
   - A. Connection to FDS
   - ✓ B. Manual upload
2. Which of the following is required to import a certificate from FortiGate?
   - A. FortiGate configuration file
   - ✓ B. FortiGate log in details



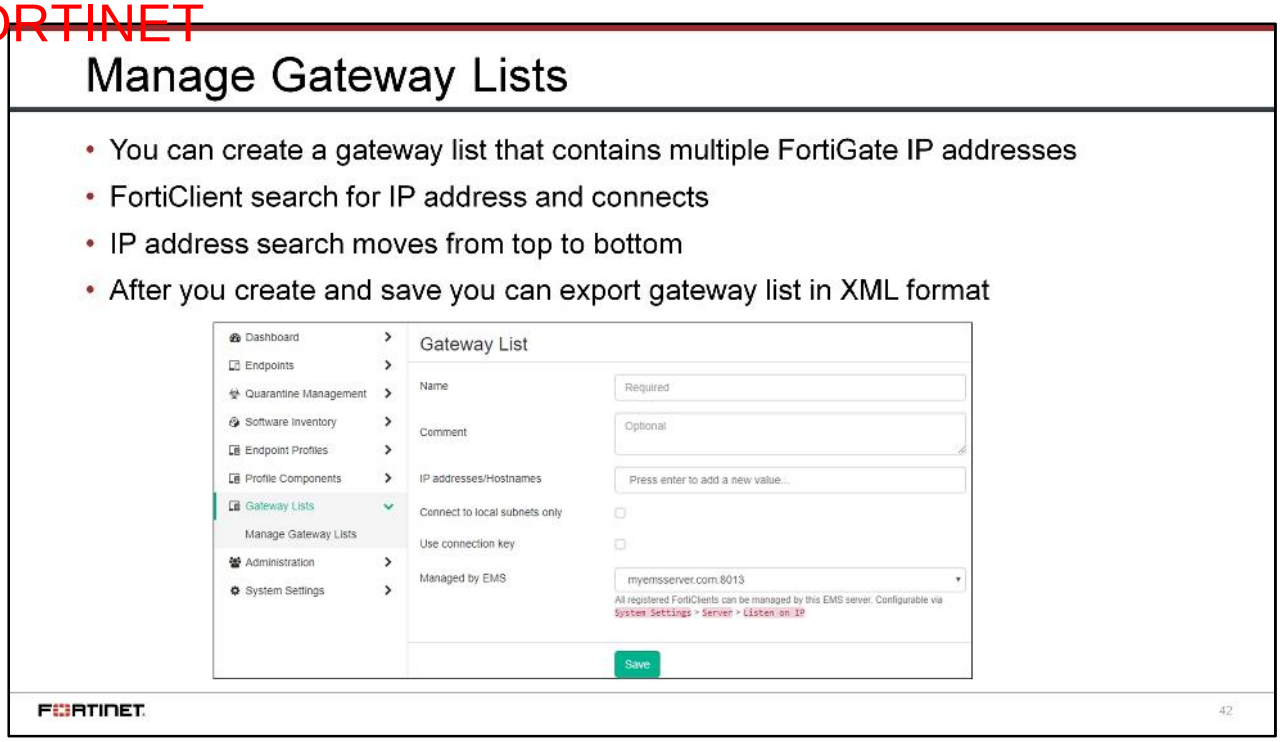
Good job! You now understand profile components.

Now, you will learn about gateway lists.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in creating, viewing, and exporting gateway lists, you will be able to work with them in your network.



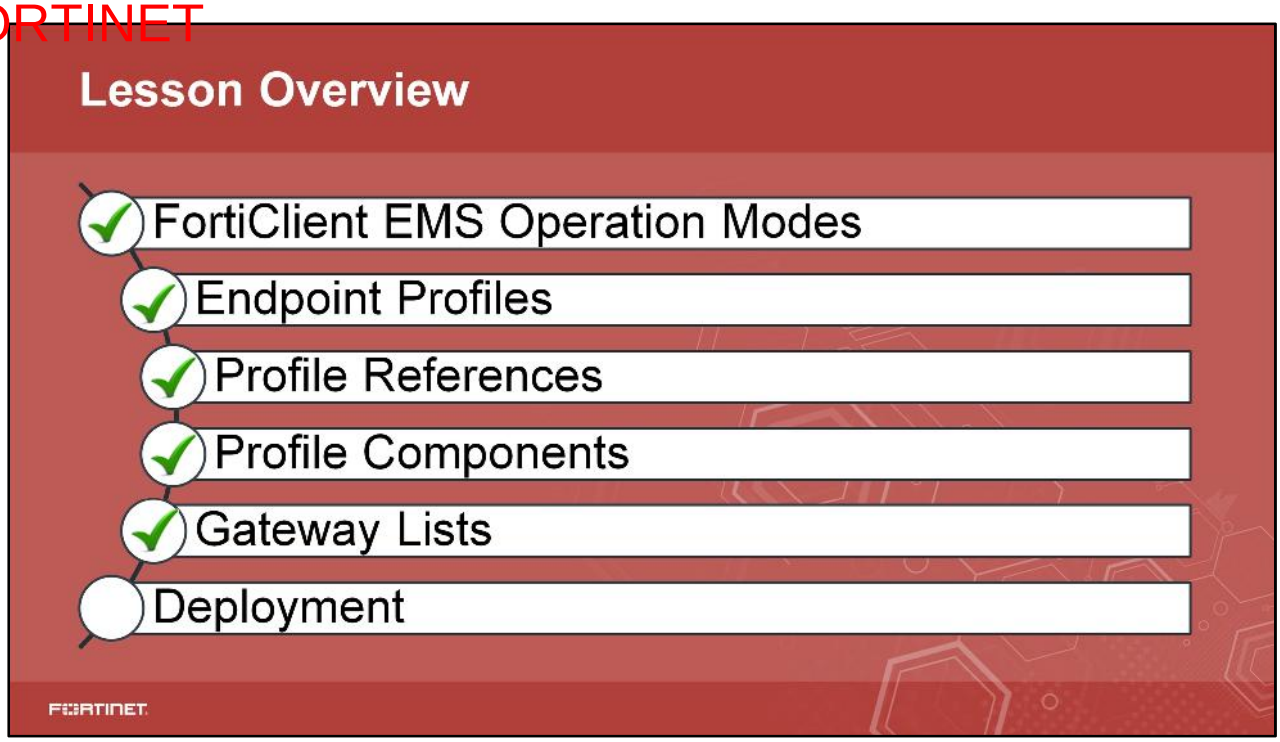
You can create a gateway list that contains IP addresses for multiple FortiGate devices. FortiClient searches for IP addresses in its subnet in the gateway IP list and connects to the FortiGate on the list that is in the same subnet as the host system. If FortiClient cannot find any FortiGate devices in its subnet, it attempts to connect to the first reachable FortiGate in the list, starting from the top. The order of the list is maintained as it was configured in the gateway list. To add additional IP addresses, press Enter.

You need the following information to create a gateway list:

- **Name**: Enter the list name
- **Comment**: Enter additional comments (optional)
- **IP addresses/Hostnames**: Enter the IP address(es) or hostname(s) of the FortiGate devices. You can also use an FQDN. Press the **Enter** key to add additional IP addresses
- **Connect to local subnets only**: Enable to only allow connection to local subnets
- **Use connection key**: Enable the connection key endpoints can use to connect to FGT
- **New connection key**: Enter the connection key
- **Confirm new connection key**: Re-enter the connection key to confirm
- **Managed by EMS**: Select an option from the drop-down list. Users can configure this IP address in **System Settings** > **Server**

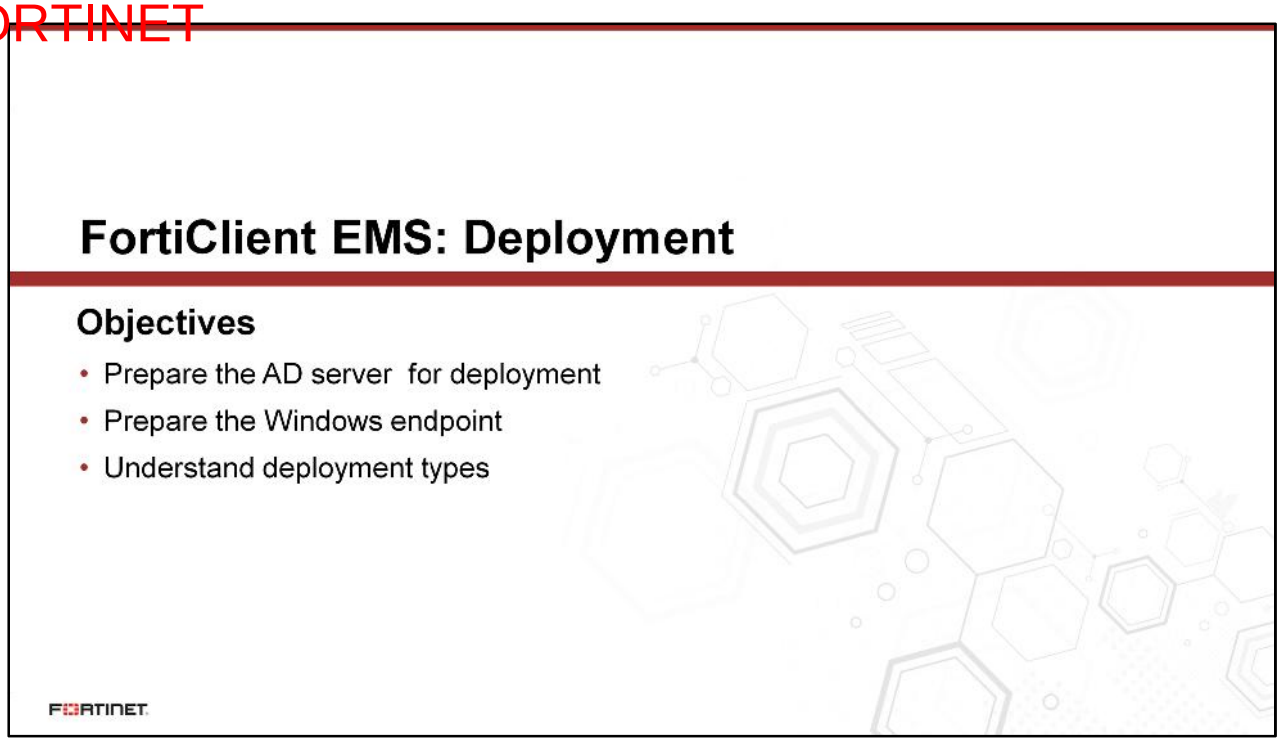
After you create and save a gateway list, the **Export XML** button displays, and you can export the list to a configuration file in XML format.

You can assign gateway lists to endpoints. When you assign the IP list and FortiClient Telemetry data connection process has started, the endpoint connects to a FortiGate or EMS, based on the gateway list. View lists by selecting an endpoint and then clicking **Summary** > **Configuration** > **Gateway List**.



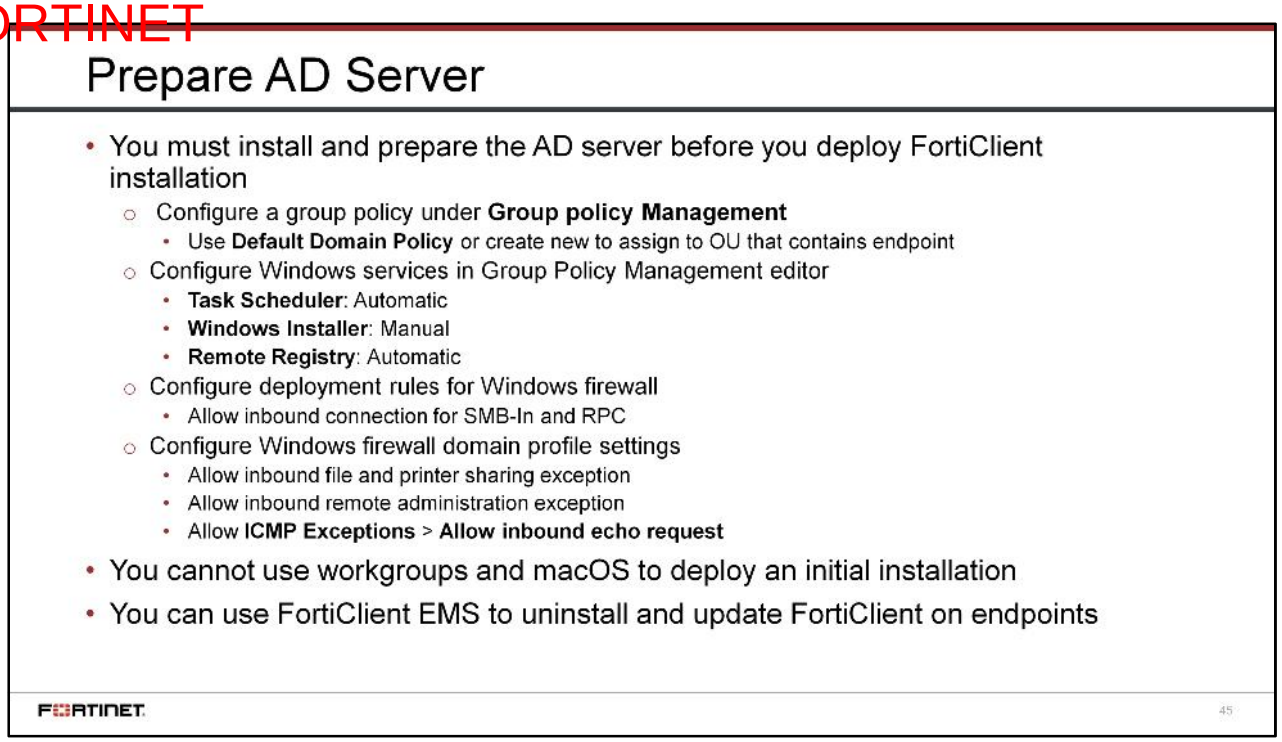
Good job! You now understand gateway lists.

Now, you will learn about FortiClient deployment.



After completing this section, you should be able to achieve the objectives shown on this slide.

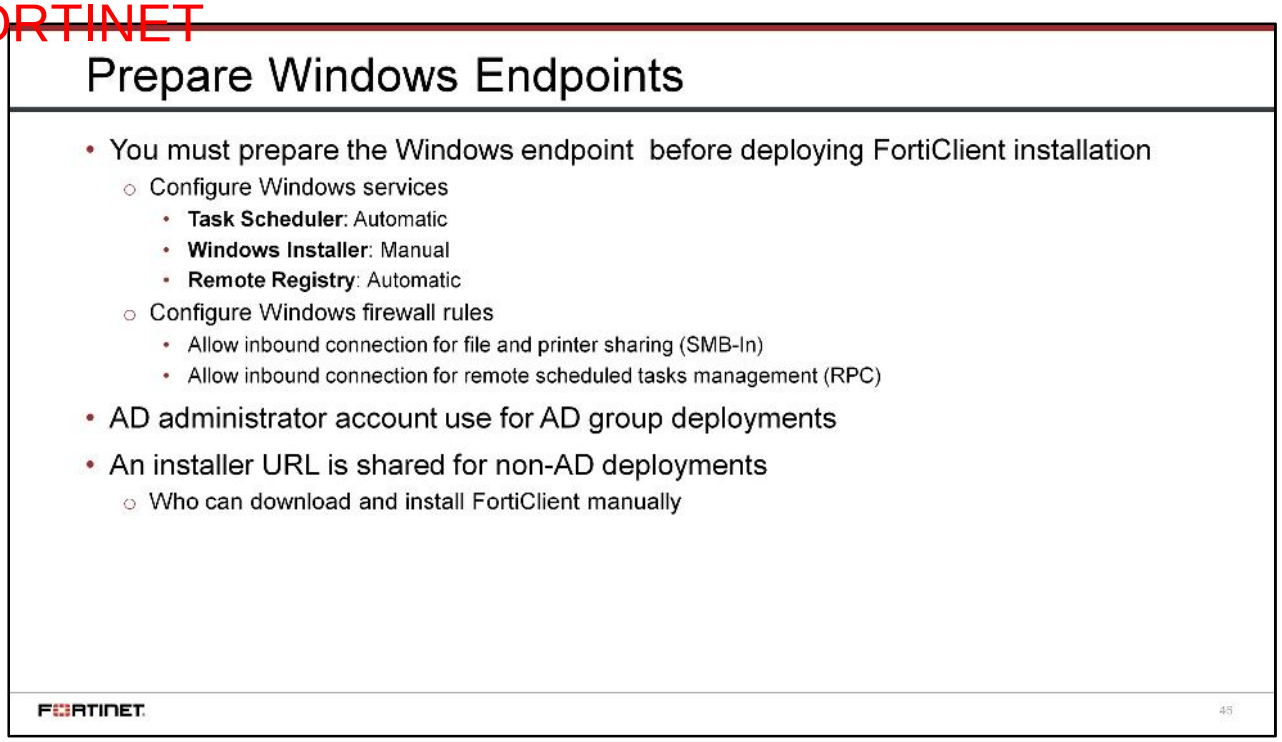
By demonstrating competence in FortiClient deployment, you will be able to prepare Windows AD server and endpoints, as well as implement different deployment types.



To deploy FortiClient from FortiClient EMS, you must prepare the AD server for deployment and deploy FortiClient on the endpoints. Before you can successfully deploy a FortiClient installation, ensure you install and prepare the AD server as follows:

1. **Configure a group policy on the AD server**.
   On the AD server open **Group policy Manager** and right-click the **Default Domain Policy** setting. The **Group Policy Management Editor** opens. A new policy is applied to the entire AD domain. Alternatively, you can create a new Group Policy Object, and link it to one or more organizational units (OU) in the AD server that contains the endpoint computers on which FortiClient will be deployed.
2. **Configuring required Windows services**.
   Configure Windows services in **Computer Configuration** > **Policies** > **Windows** > **Settings** > **Security Settings** > **System Services** as mentioned in the slide.
3. **Creating deployment rules for Windows firewall**.
   You need new inbound rules to allow **File and Printer Sharing(SMB-In)** and **Remote Scheduled Tasks Management (RPC)**.
4. **Configure Windows firewall domain profile settings**
   You must add exceptions for domain profile
   - **Allow inbound file and printer sharing**(require EMS server's IP address)
   - **Allow inbound remote administration**(require EMS server's IP address)
   - **Allow ICMP Exceptions** > **Allow inbound echo request**

Note that you cannot use FortiClient EMS to deploy an initial installation of FortiClient to endpoints (macOS and workgroup computers). However, after FortiClient is installed on endpoints and the endpoints are connected to FortiClient EMS, you can use FortiClient EMS to uninstall and update FortiClient on endpoints.



You must enable and configure the following services on each Windows endpoint before FortiClient deployment:

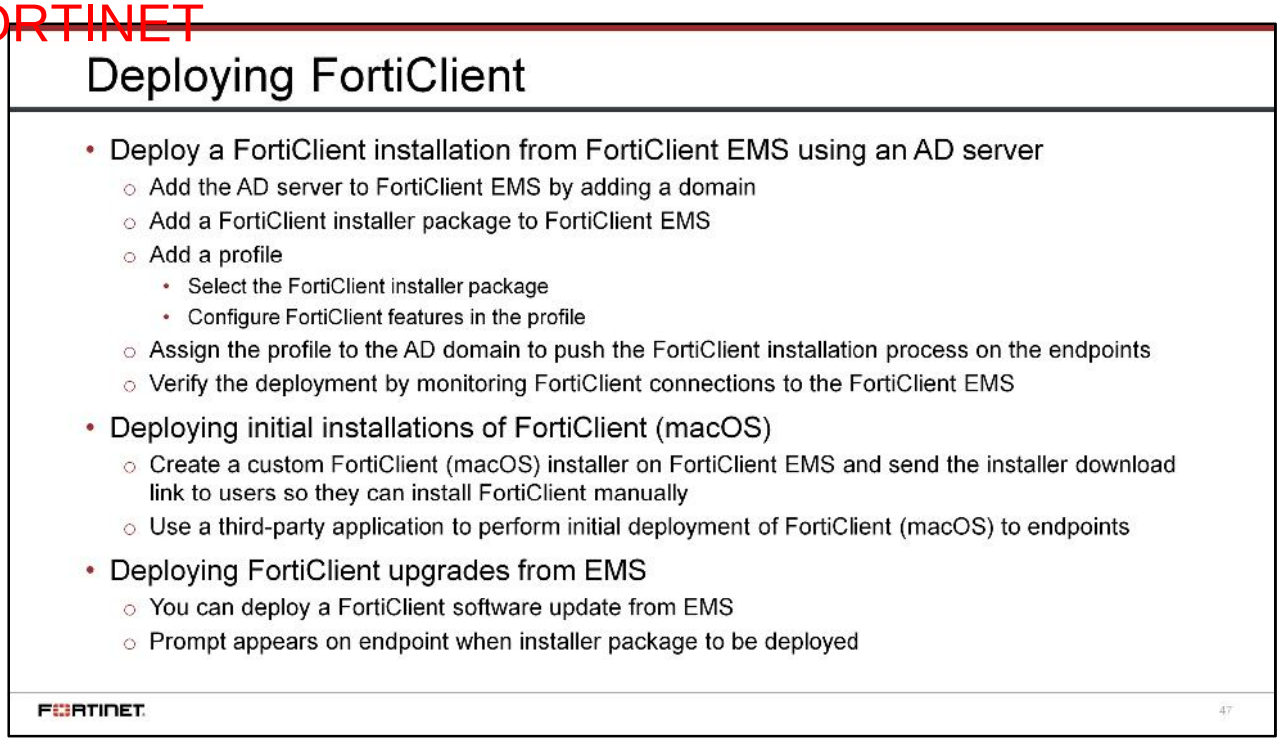
- Task Scheduler: Automatic
- Windows Installer: Manual
- Remote Registry: Automatic

The Windows firewall must allow SMB-In and RPC traffic for inbound connections.

For AD group deployments, an AD administrator account is required. For non-AD deployments, the installer URL can be shared with users, who can then download and install FortiClient manually. You can locate the installer URL in **Manage Installers**. Click **Profile Components** > **Manage Installers**.

Note that when you are adding endpoints using an AD domain server, FortiClient EMS automatically resolves endpoint IP addresses during initial deployment of FortiClient. FortiClient EMS can deploy FortiClient (Windows) to AD endpoints that do not have FortiClient installed, as well as upgrade existing FortiClient installations if the endpoints are already connected to the EMS server.

You can execute `gpresult.exe /H gpresult.html` on any AD client to verify if you have an issue pushing the group policy to the endpoints.



Deploying FortiClient on endpoints: For successful deployment of FortiClient installation from FortiClient EMS using AD server, you must prepare the AD server, add the AD server to FortiClient EMS as a domain, add an installer package to FortiClient EMS, add a profile, which includes the installer package and configured FortiClient features, and assign the profile to a branch of the AD domain to push the installation. You can verify the deployment by monitoring FortiClient connections to the EMS.

Deploying initial installations of FortiClient (macOS): FortiClient EMS cannot be used to deploy initial installations of FortiClient (macOS). You can deploy an initial installation of FortiClient (macOS) by doing one of the following:

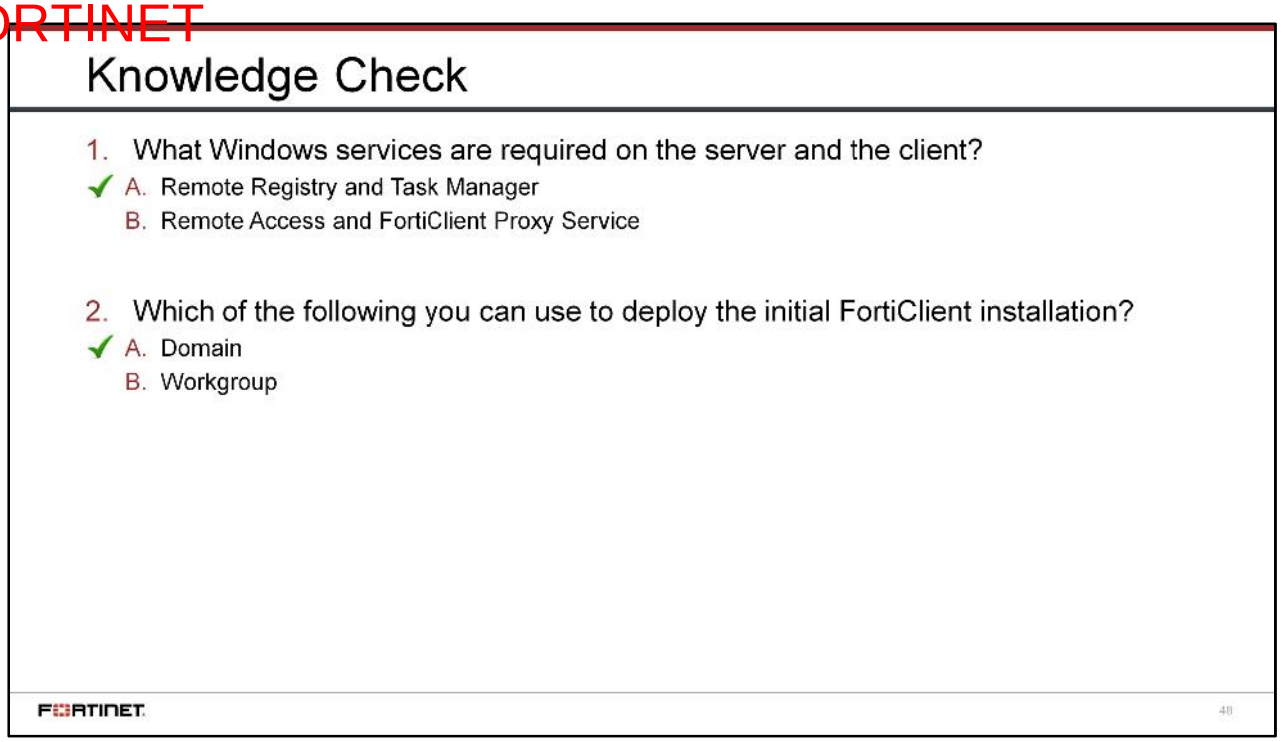
- Create a custom FortiClient (macOS) installer on EMS with the EMS IP address embedded. Send the installer download link to users so they can install FortiClient manually on the endpoint.
- Use a third-party application to perform the initial deployment of FortiClient (macOS) to endpoints.

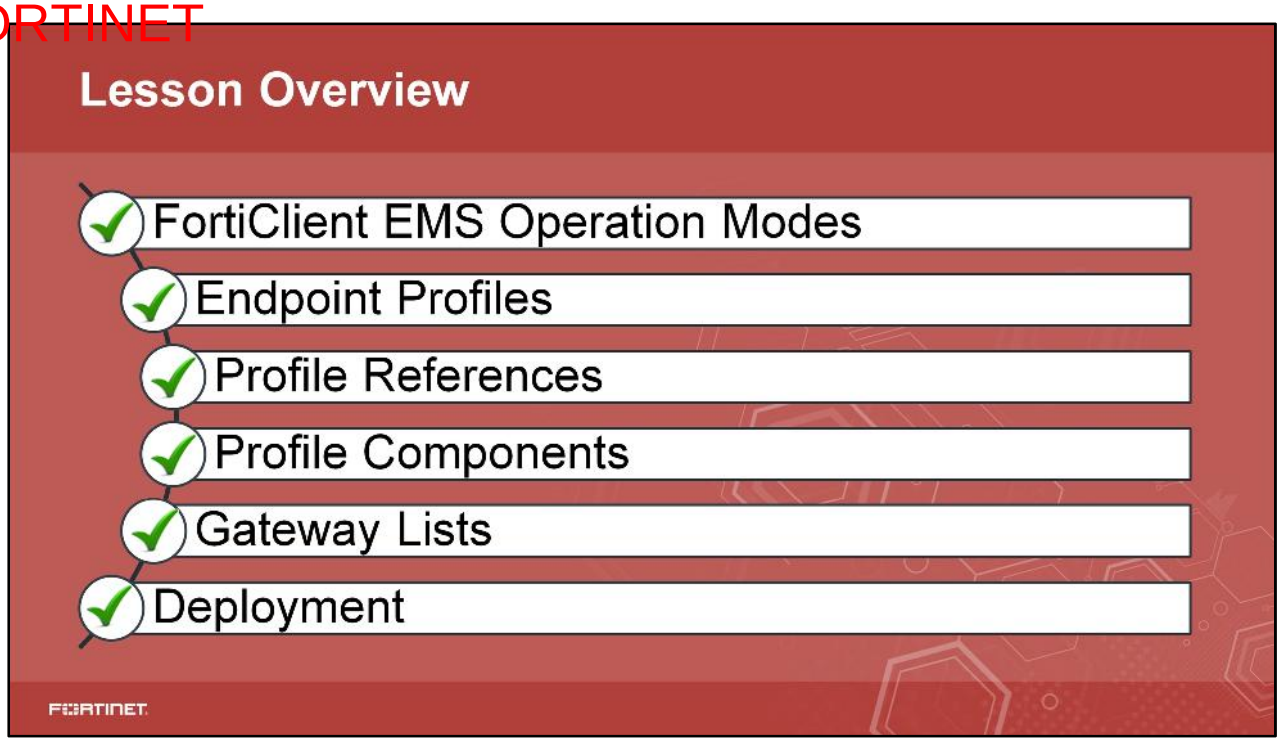
After FortiClient (macOS) is installed on endpoints and you have connected FortiClient Telemetry to FortiClient EMS, you can use FortiClient EMS to replace, upgrade, and uninstall FortiClient.

Deploying FortiClient upgrades from EMS: You can deploy a FortiClient software update from EMS. A prompt appears on the FortiClient endpoint when an installer package is requested to be deployed. The prompt requests the user to do one of the following:

- **Upgrade Now**: If this option is selected, it performs the upgrade and automatically restarts your computer.
- **Upgrade Later**: If this option is selected, you can indicate the time to start the upgrade. The default is 8:00 PM. Your computer automatically restarts after the upgrade.

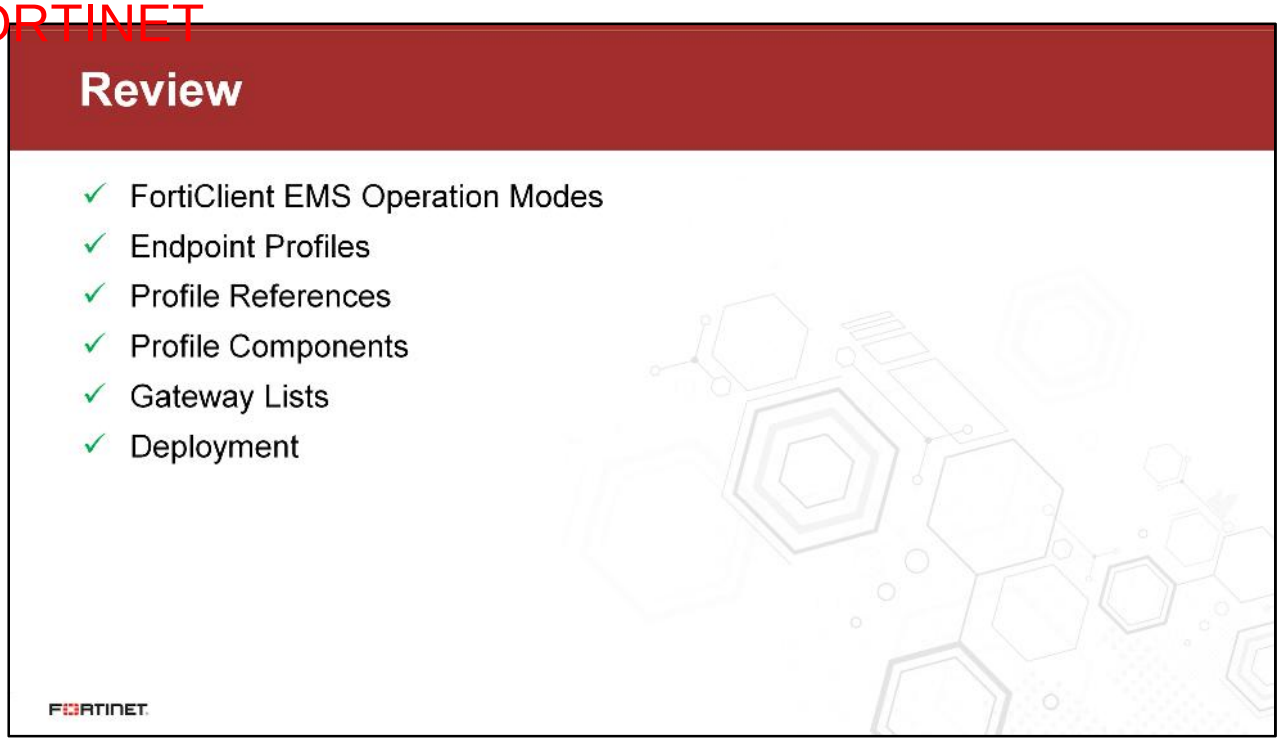
If no option is selected, the upgrade occurs by default at 8:00 PM. After FortiClient EMS uninstalls the previous version, it asks if the user wants to **Reboot now** or **Reboot later**.





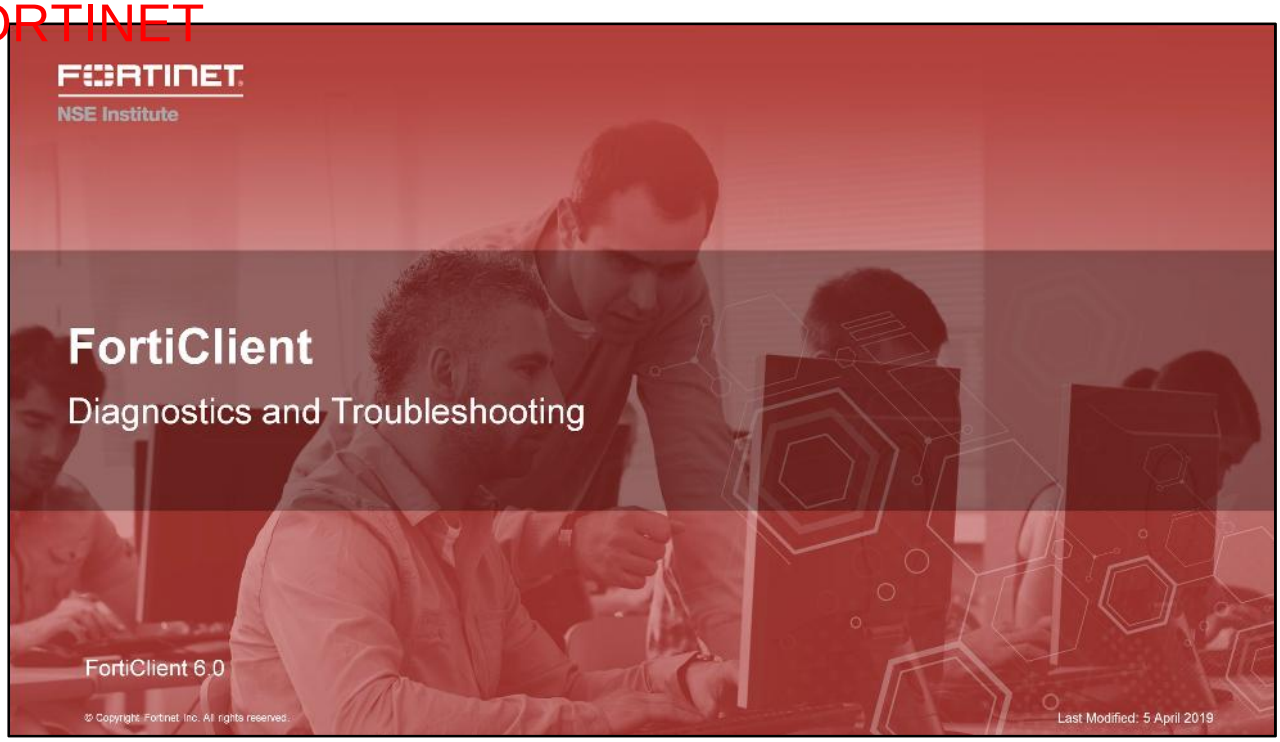
Congratulations! You have completed this lesson.

Now, you will review the objectives that you covered in this lesson.

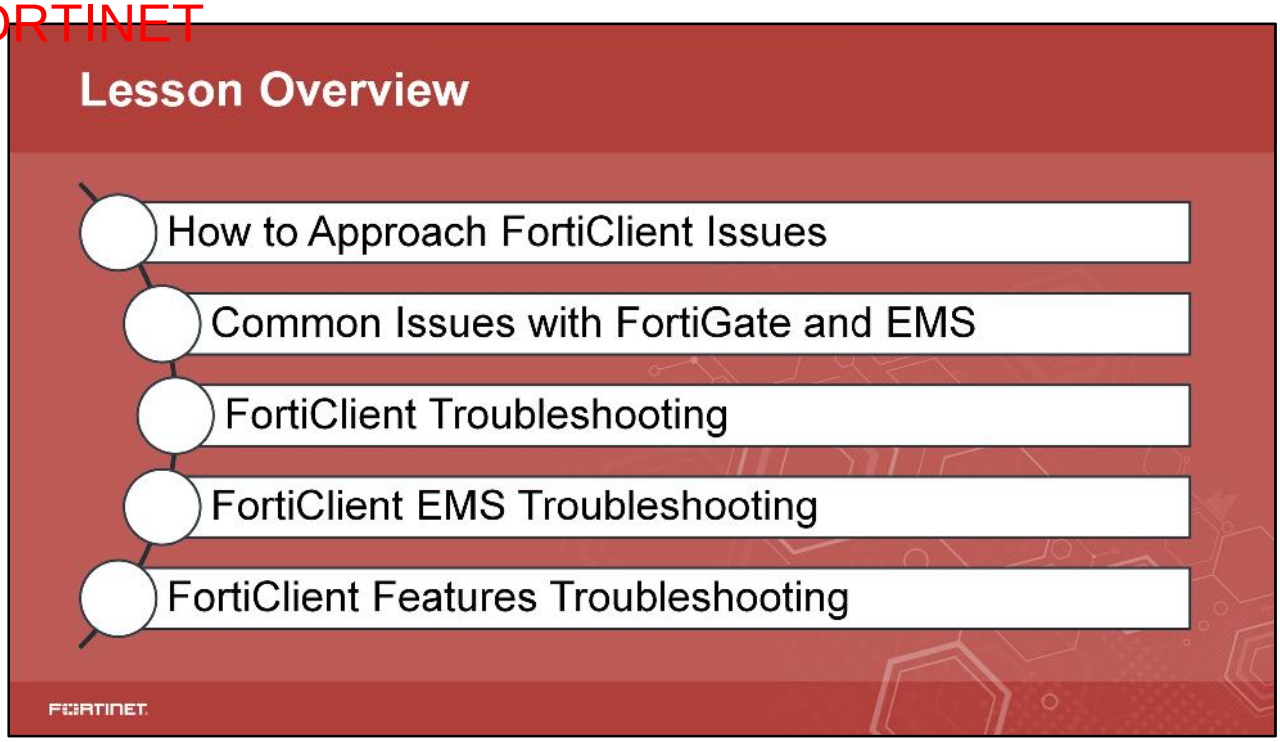


This slide shows the objectives that you covered in this lesson.

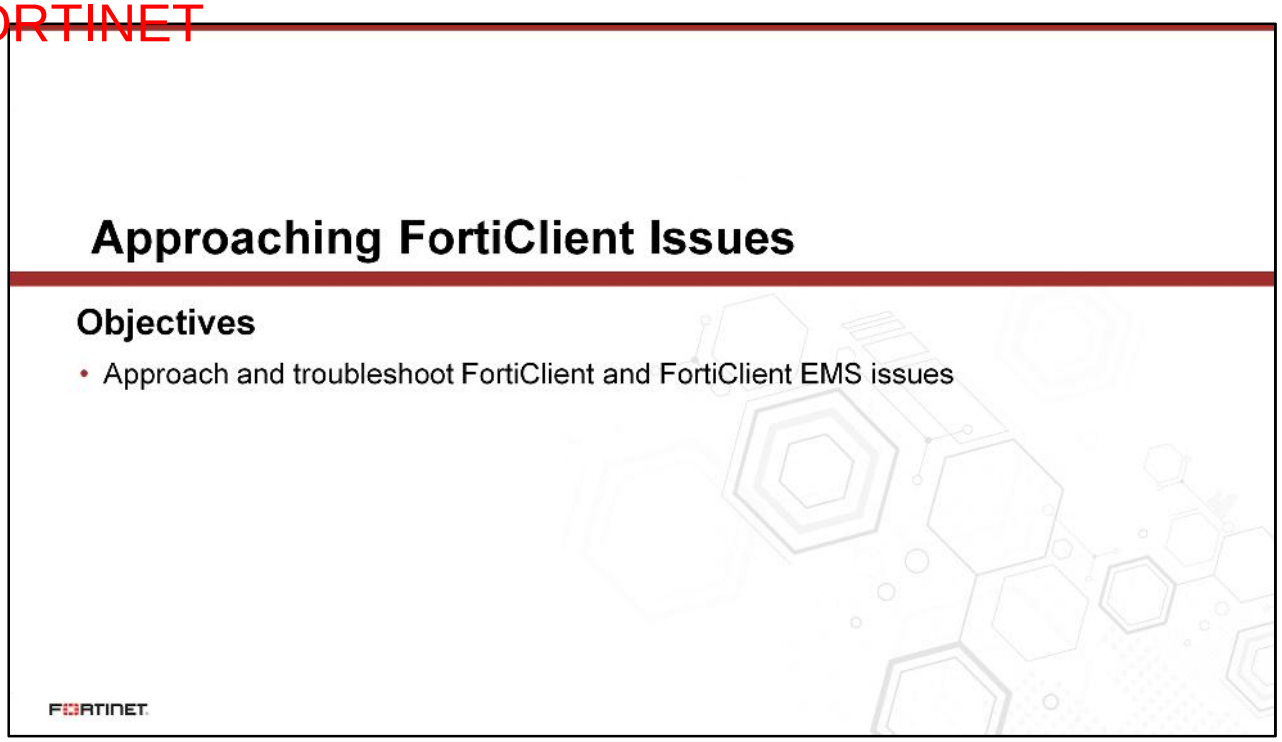
By mastering the objectives covered in this lesson, you learned how to use FortiClient EMS operation modes, endpoint profiles, profile references, and components. You also learned about deployment types and gateway list.



In this lesson, you will learn how to diagnose and troubleshoot FortiClient and FortiClient EMS issues.

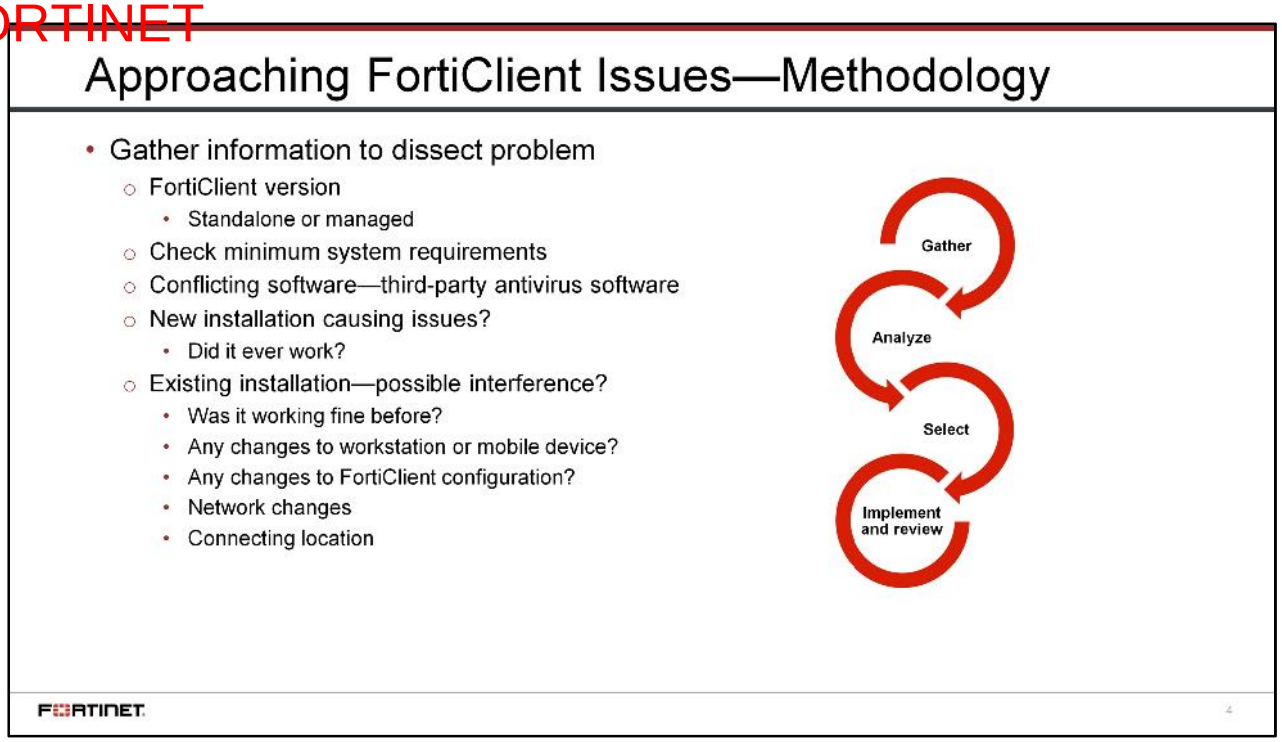


In this lesson, you will learn about the topics shown on this slide.



After completing this section, you should be able to approach and troubleshoot FortiClient and FortiClient EMS issues.

By demonstrating competence in approaching FortiClient issues, you will be able to solve FortiClient and FortiClient issues.

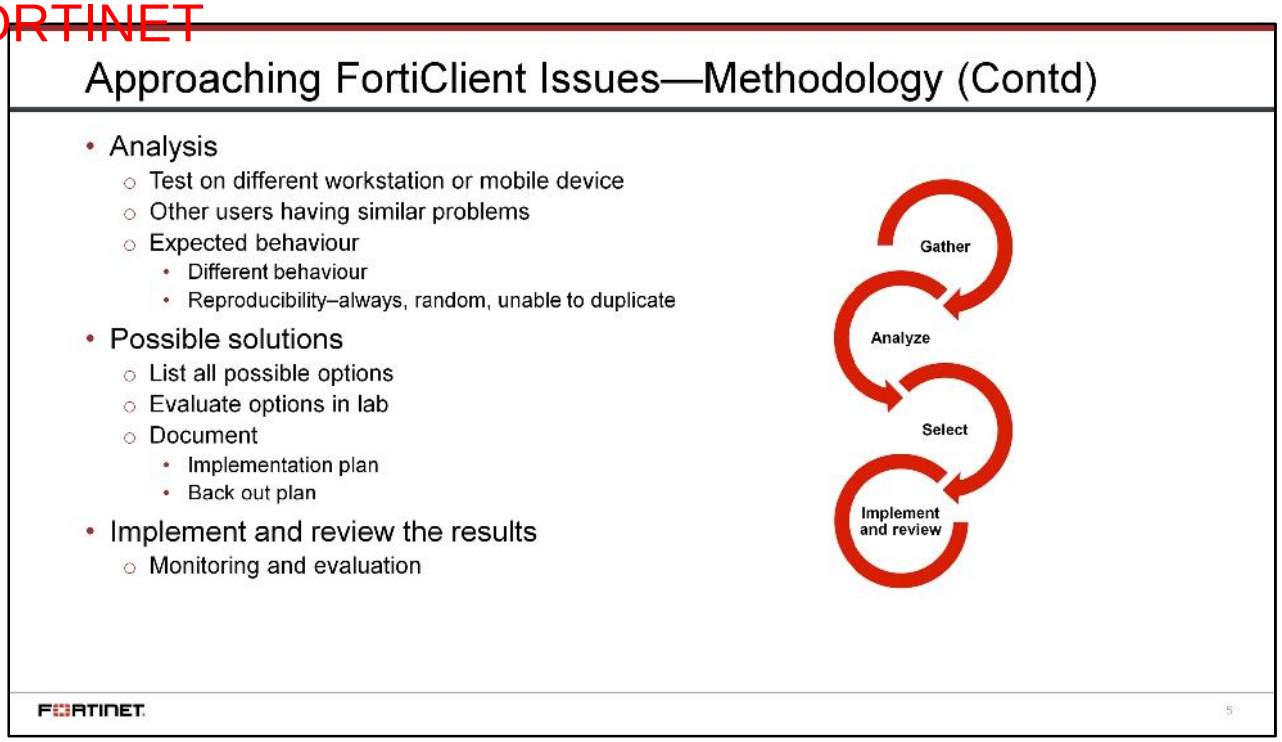


Before you can resolve a FortiClient issues, you need to identify the issue by gathering information to pinpoint and define it.

For example, if the issue is *registering FortiClient to FortiGate or FortiClient EMS*, check the following: Has the registration process ever worked. Is the existing installation not working?

If yes, check for possible changes, such as changes to the device (OS updates, changes to administrator permissions), connection location (working from the office but not from home), and configuration and network changes.

Now you know the exact nature of the problem: *FortiClient is not registering from home*. The next step is to analyze the problem, which leads to possible opportunities to resolve the issue.

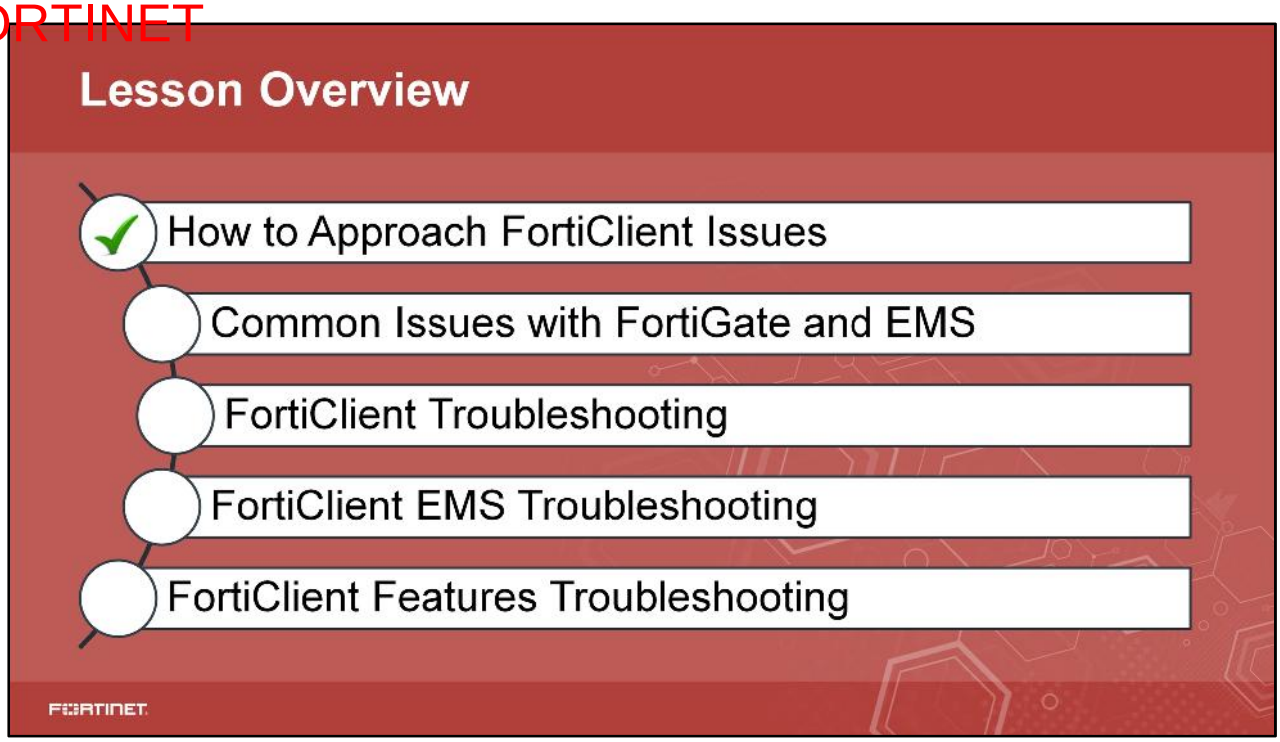


The analysis phase requires testing, checking, and comparing with other users to find if they are encountering similar issues.

Once that is determined, to further dissect the issue, compare the expected results with your results and find out if the issue is reproducible, which results in a list of possible solutions to evaluate in the lab.

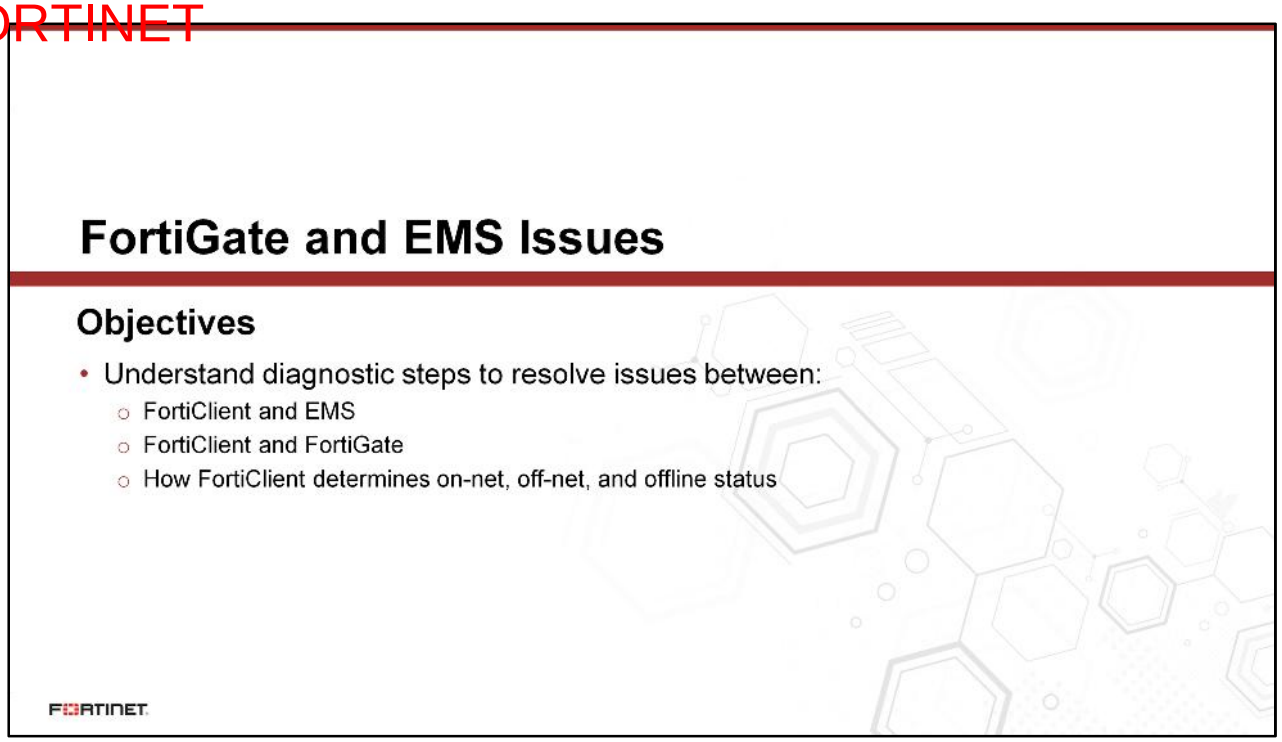
Remember, there might be multiple ways to resolve a issue. You should always document each of them and create a back up plan before implementing a solution in case you need to revert to a previous state.

Once you implement a solution, monitor and review the solution.



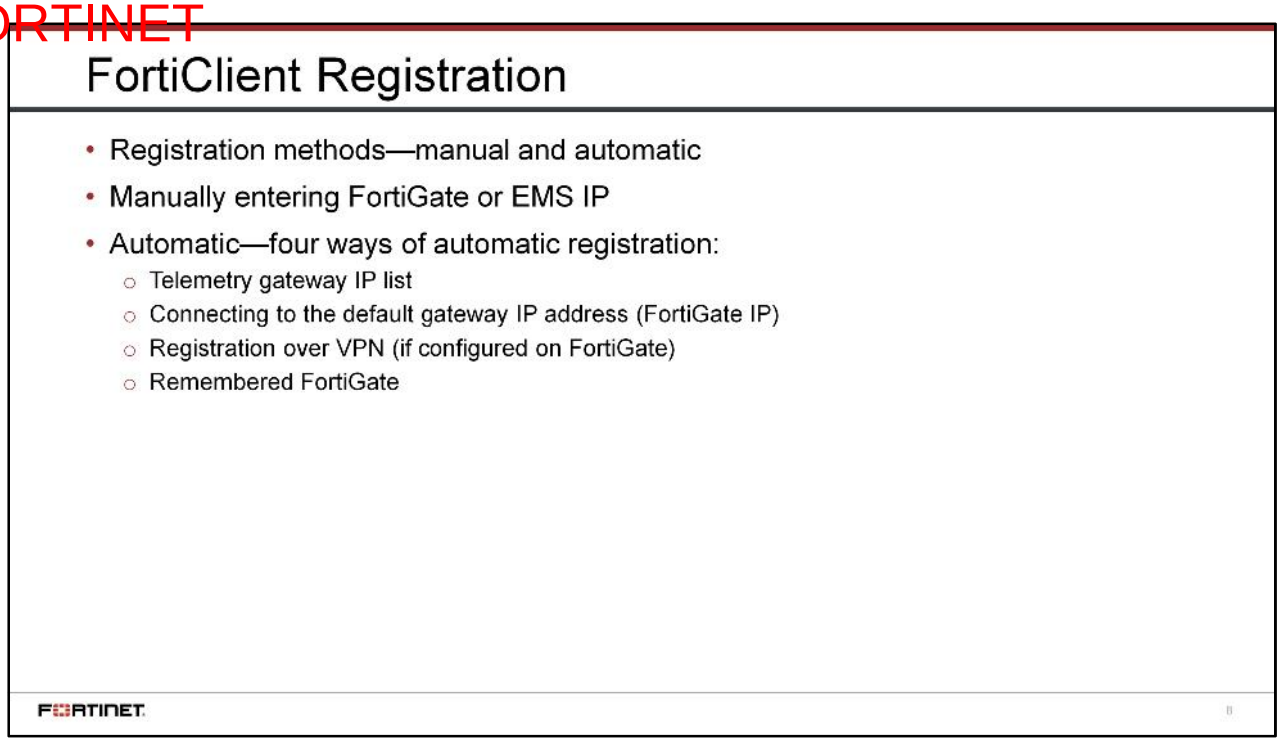
Good job! You now understand how to approach FortiClient and FortiClient EMS issues.

Now, you will learn about FortiClient EMS issues.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in taking diagnostic steps, you will be able to diagnose and resolve common issues between FortiClient, FortiClient EMS, and FortiGate.



FortiClient uses the following methods in the following order to locate FortiGate or EMS for a telemetry connection:

- Manually entering the gateway IP address. The user enters the gateway IP address of FortiGate or EMS on FortiClient

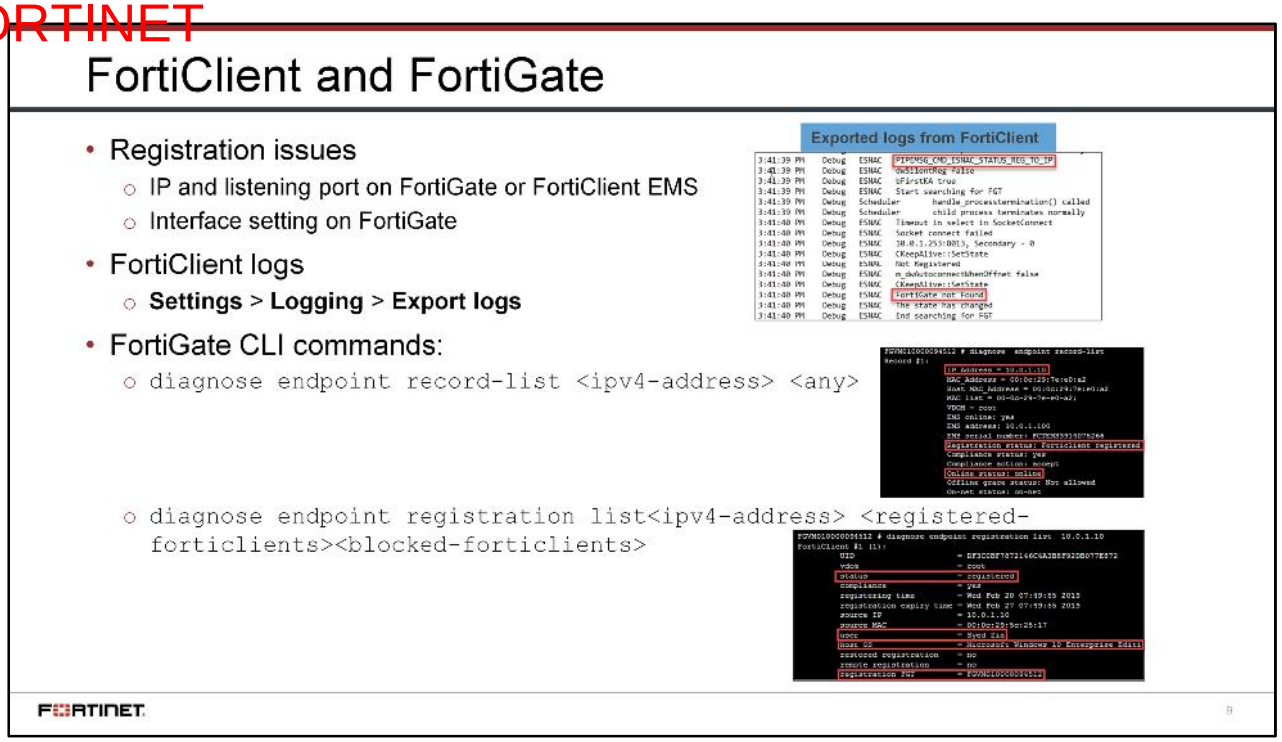
- Telemetry gateway IP list: FortiClient Telemetry searches for IP addresses in its subnet in the gateway IP list. It connects to the FortiGate in the list that is also in the same subnet as the host system.
  If FortiClient cannot find any FortiGate devices in its subnet, it attempts to connect to the first reachable FortiGate on the list, starting from the top. The order of the list is maintained as configured on the gateway IP list.

- Default gateway IP address: The default gateway IP address is specified on the FortiClient endpoint and is used to automatically connect to FortiGate. This method does not support connections to EMS.
  FortiClient obtains the default gateway IP address from the operating system on the endpoint. The default gateway IP address of the endpoint should be the IP address of the FortiGate interface that has telemetry enabled.

- VPN

- Remembered gateway IP list: You can configure FortiClient to remember gateway IP addresses when you connect Telemetry to FortiGate or EMS. Later, FortiClient can use the remembered IP addresses to automatically connect Telemetry to FortiGate or EMS.

Note that FortiClient uses the same process to connect Telemetry to FortiGate or EMS after the FortiClient endpoint reboots, rejoins the network, or encounters a network change.



If FortiClient is not able to register to on FortiGate, make sure the firewall or another program is not blocking the FortiGate interface IP and port 8013. Check the interface setting on FortiGate to make sure **FortiTelemetry** is enabled on the interface.

In the example logs shown on this slide, **FortiTelemetry** is not enabled on FortiGate and, because of that, FortiClient is not able to find FortiGate. You can capture packets on the local PC to make sure packets are routed toward FortiGate, or run the sniffer on FortiGate to verify the traffic flow. Make sure to check the interface settings on the FortiGate.

Once FortiClient access is enabled, FortiClient detects FortiGate and preregisters on FortiGate, whereas FortiGate verifies, registers, and applies the correct FortiClient profile.

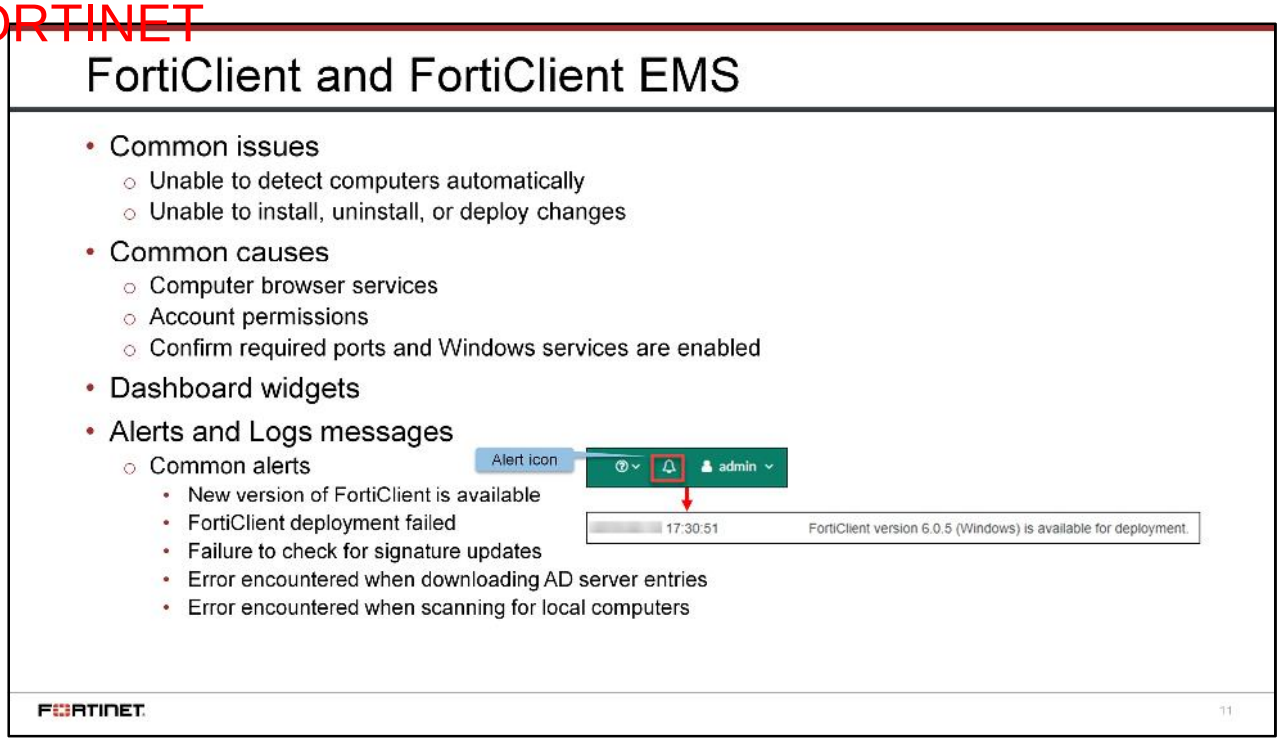
You can run endpoint commands to verify the endpoint record and registration on FortiGate:

The diagnose endpoint record-list command:
- Provides the IP address, registration status, online status, and so on, for the FortiClient endpoint

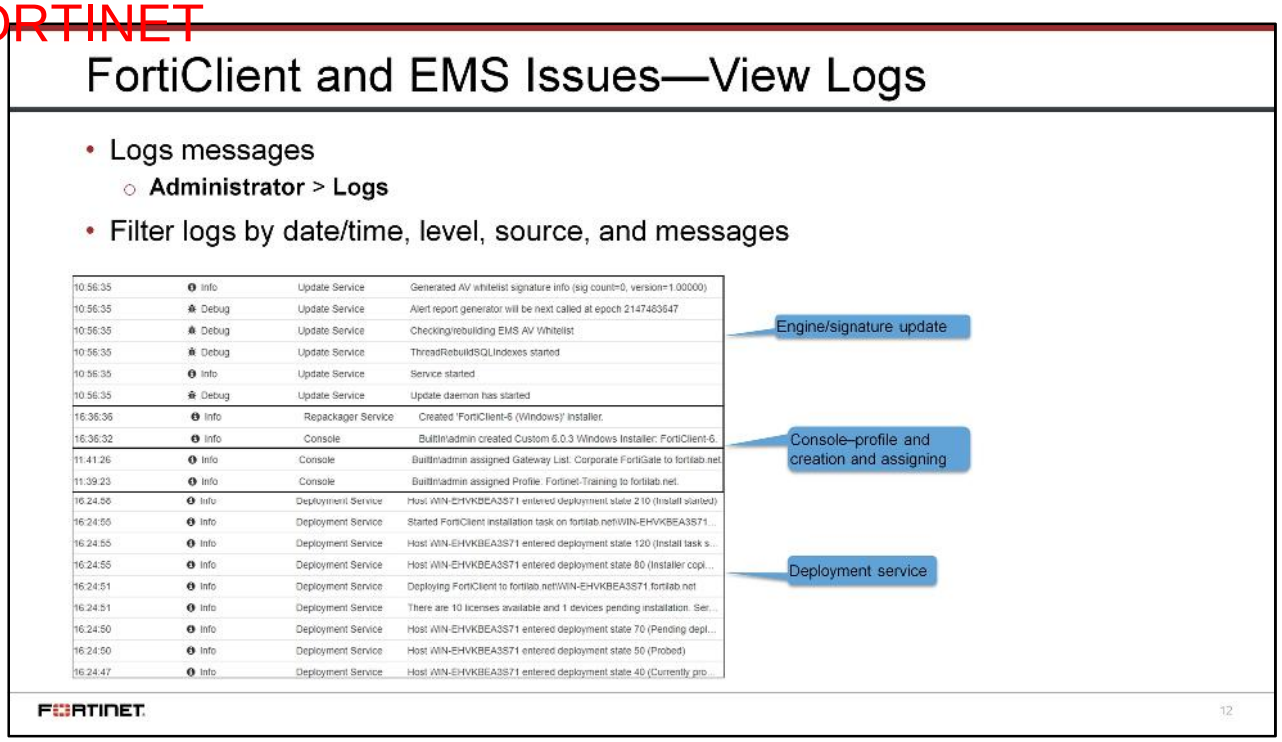
The diagnose endpoint registration list<ipv4-address> <registered-forticlients><blocked-forticlients> command:
- Provides further details such as status, user, host OS, and serial number of the registration FortiGate

FortiClient and FortiGate

- Fortigate endpoint compliance diagnostic commands
  - diagnose endpoint record-list <optional source IPv4>
  - diagnose endpoint record-summary
  - diagnose endpoint record-delete <optional source IPv4>
  - diagnose endpoint information
  - diagnose endpoint registration summary
  - diagnose endpoint registration list
  - diagnose endpoint registration block <FortiClient UID>
  - diagnose endpoint registration unblock <FortiClient UID>
  - diagnose endpoint registration deregister<all><FortiClient UID>

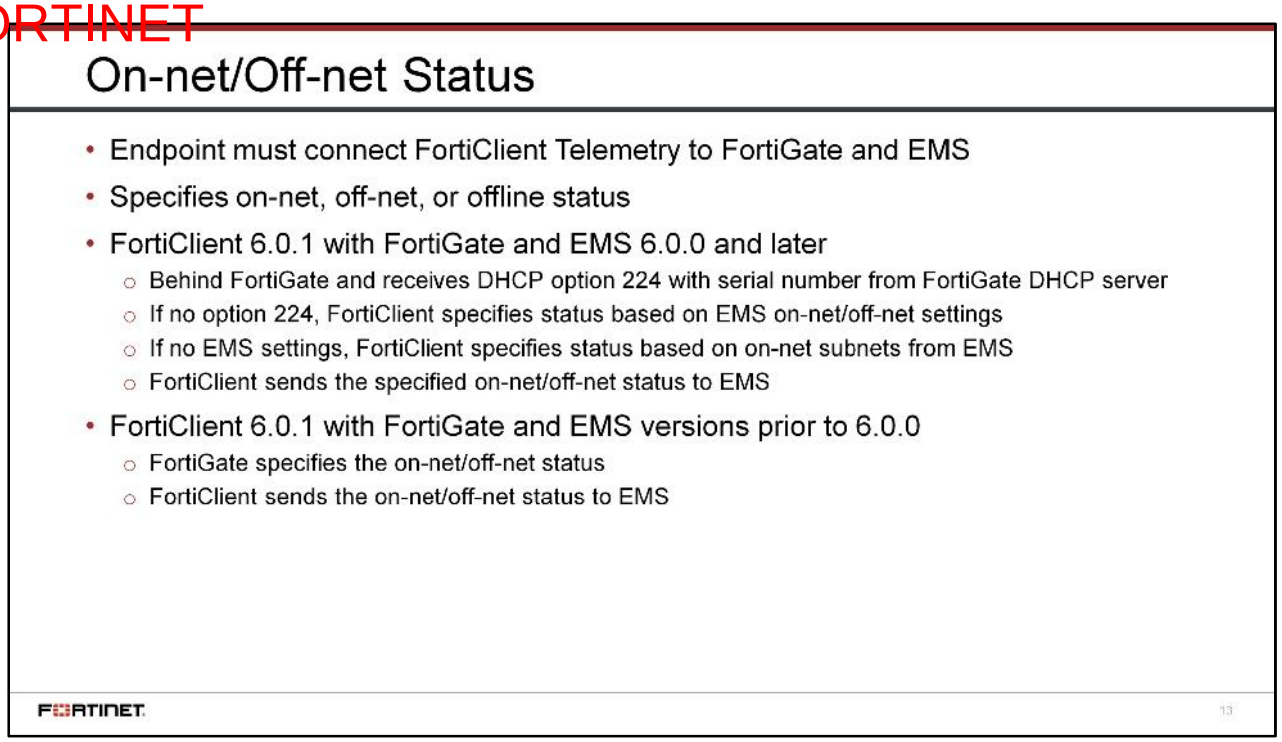


There can be multiple dependencies and various factors involved when troubleshooting FortiClient and FortiClient EMS issues. Common issues can be that FortiClient is unable to detect automatically any computer running Microsoft Windows, you are unable to install or uninstall FortiClient from the host machine, or you are unable to deploy changes using FortiClient EMS.
You can resolve these issues by verifying the following:
Computer browser services: Automatically detects Microsoft Windows computers within the same local network. Make sure Computer Browser Services is running. For example, if the FortiClient EMS is installed on Windows 2012 R2 on which, by default, Computer Browser Service is disabled, FortiClient EMS will not detect computers on the same network, even if they are available.
Account permissions: Make sure the server and client have correct account permissions to deploy the changes. For example, if the administrator doesn't have the correct permissions to create or deploy the changes on FortiClient EMS or the client machine won't allow the account used for FortiClient EMS to make changes to the remote registry.
Confirm required ports and Windows services are enabled: FortiClient EMS uses many ports and services in order to communicate with clients and servers running associated applications. Make sure these ports and services, such as TCP 8013 used for FortiClient endpoint registration, Samba (SMB) service (port 445) and Distributed Computing Environment/Remote Procedure Calls (DCE- RPC) (port 135) used for FortiClient deployment, AD server connection 389, Windows (TCP port 80), Internet Information Services (IIS) (TCP port 443,10443), and SQL server are enabled for use for FortiClient EMS. On the client side, make sure Task Scheduler is set to `Automatic`, Windows Installer is set to `Manual` and Remote Registry is set to `Automatic`.
FortiClient EMS has several dashboard widgets that provide information about managed clients and their current statuses. You can view alerts generated by FortiClient EMS by clicking the bell icon in the toolbar, which shows you alerts generated. An example of a common alert is "New version of FortiClient is available".



You can view the logs on FortiClient EMS by clicking **Administrator** > **Logs**. You can filter logs by using various parameters and so on such as date/time, log level, source (such as **EMS Service**, **Update Service**, **AD Service**, and so on) and messages.

In the example shown on this slide, the logs provide detailed messages about the event occurred, which you can use to troubleshoot the issues with FortiClient and FortiClient EMS. You should change the log level to **Debug**.



FortiGate and EMS

The version of FortiOS and EMS affects how on-net, off-net, or online status is specified.

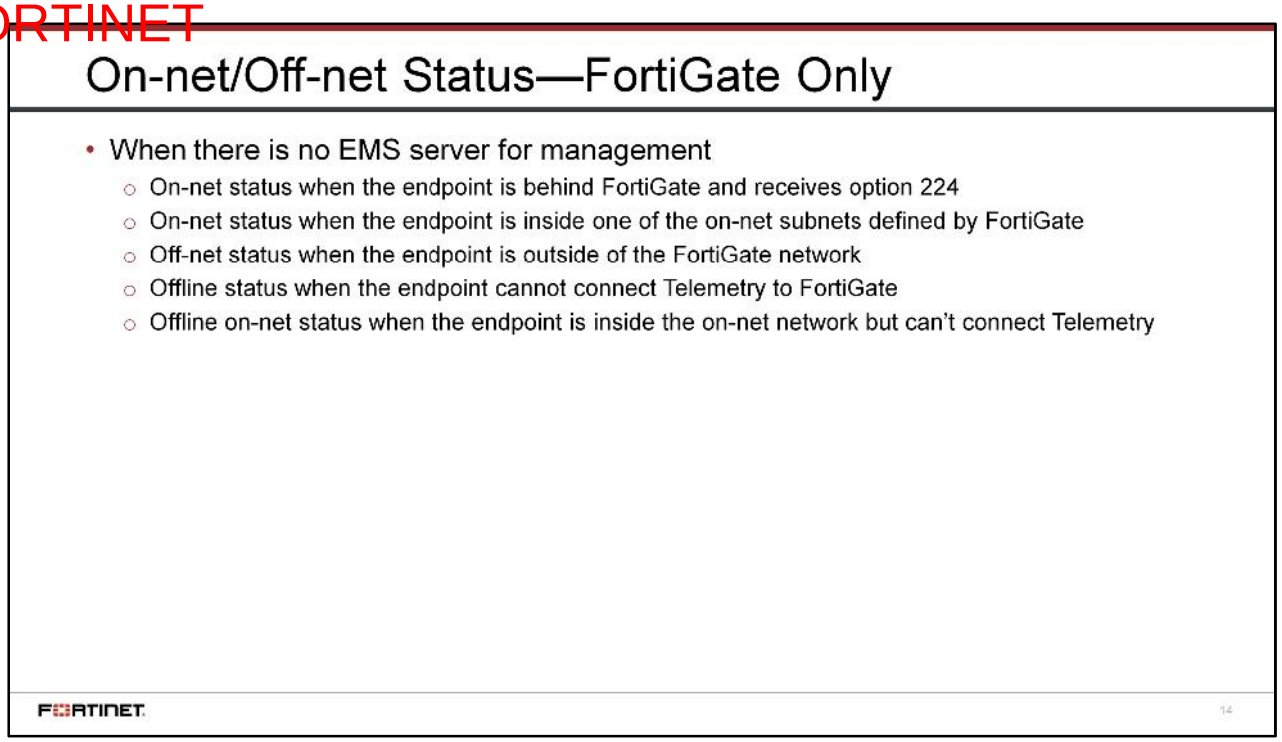
FortiClient 6.0.1 with FortiGate and EMS 6.0.0 and later
When FortiClient 6.0.1 with FortiGate and EMS 6.0.0 and later, FortiClient calculates on-net/off-net information. The following examples show how FortiClient specifies the endpoint status:

- The endpoint has an on-net status when the endpoint is behind a FortiGate and receives option 224 with the FortiGate serial number. In this case, FortiGate is the DHCP server, and FortiGate checks that the serial number matches its own serial number.
- If option 224 is not received or there is no match with the currently registered serial number, FortiClient specifies on-net/off-net status based on the DHCP on-net/off-net setting in EMS.
- If there is no EMS setting, FortiClient specifies on-net/off-net status based on the on-net subnets received from EMS
- FortiClient sends the specified on-net/off-net status to EMS

FortiClient 6.0.1 with FortiGate and EMS versions earlier than 6.0.0

- FortiGate specifies the on-net/off-net status
- FortiClient sends the on-net/off-net status to EMS

Note that you must remove `on-net` subnet setting from FortiClient XML manually before configuring `on-net` using EMS. When FortiGate and EMS are integrated, the primary FortiClient Telemetry connection is to FortiGate, and FortiGate calculates the status.

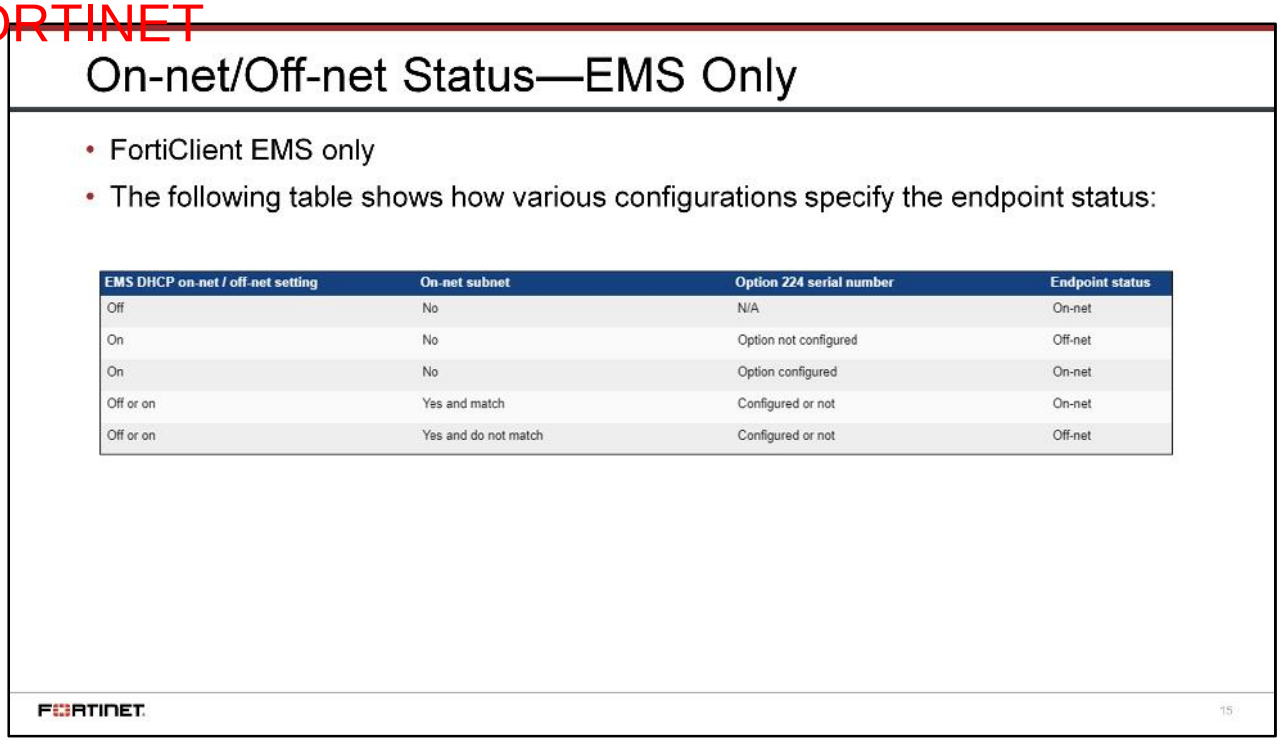


FortiGate only

The versions of FortiClient and FortiOS do not affect the on-net, off-net, or online status. The following examples show how the endpoint status is specified when FortiClient is connected to FortiGate only:

- The endpoint has an on-net status when the endpoint is behind a FortiGate and receives option 224 with the FortiGate serial number. In this case, FortiGate is the DHCP server, and FortiGate checks that the serial number matches its own serial number.
- The endpoint has an on-net status when the endpoint is inside one of the on-net subnets defined by FortiGate. You can configure on-net subnets in the FortiClient Compliance profile using the FortiOS CLI and the set on-net addr command.
- The endpoint has an off-net status when the endpoint is outside of the FortiGate network, such as connected through an external interface or has not received option 224 with the FortiGate serial number.
- The endpoint has an offline status when the endpoint cannot connect FortiClient Telemetry to FortiGate and the endpoint is outside one of the on-net networks, even when option 224 and the FortiGate serial number are configured.
- The endpoint has an offline on-net status when the endpoint is inside one of the on-net networks, but cannot connect FortiClient Telemetry to FortiGate.

Note that for FortiClient to be in an on-net network, the IP address of FortiGate or EMS should be routed through the IP address from the on-net network.



FortiClient EMS only

The FortiClient and EMS versions do not affect the on-net, off-net, or online status. The table on the slide shows how various configurations specify the endpoint status when FortiClient Telemetry is connected to EMS.

The following examples show how endpoint status is specified when FortiClient is connected to EMS only:

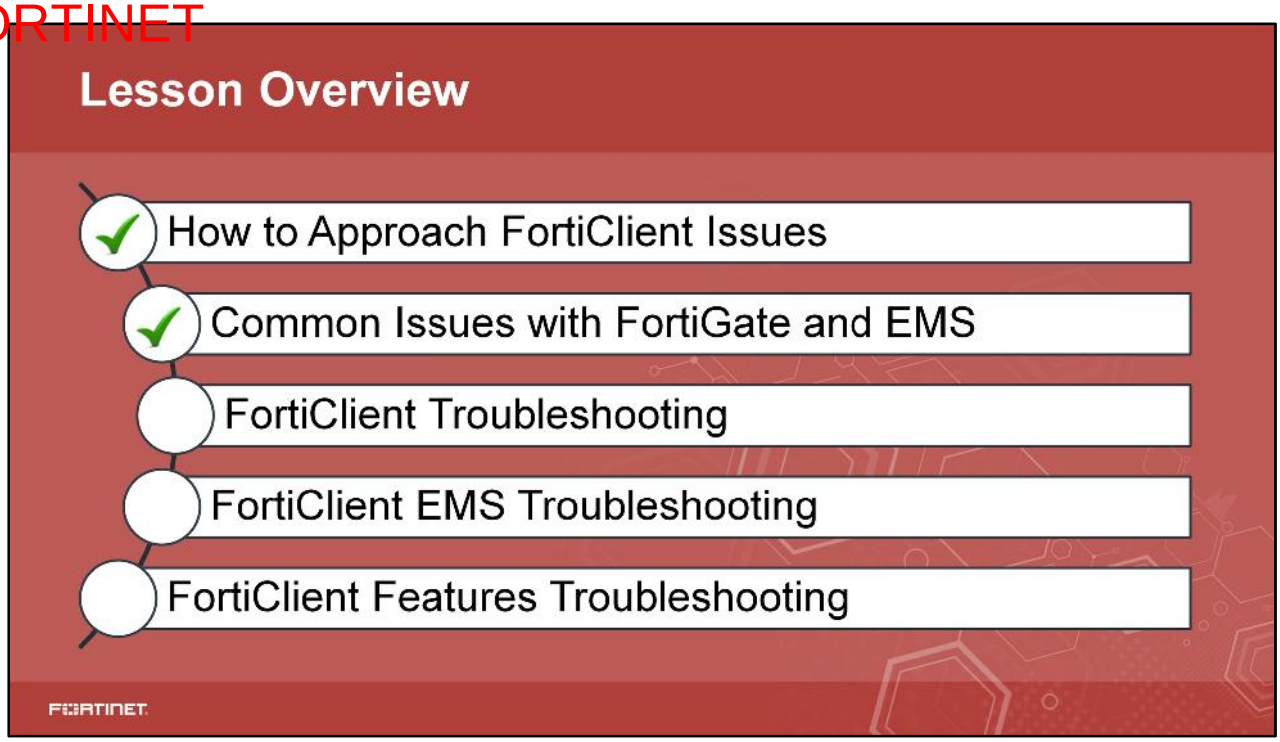
- The endpoint has an offline status when the endpoint cannot connect FortiClient Telemetry to EMS and is outside one of the on-net networks
- The endpoint has an offline on-net status when the endpoint cannot connect FortiClient Telemetry to EMS but is inside one of the on-net networks

Note that *On-net* subnets have higher priority over other settings. In addition, EMS does not compare the option 224 serial number. As long as the endpoint has the serial number, EMS assumes the endpoint is behind FortiGate and is on-net.

Knowledge Check

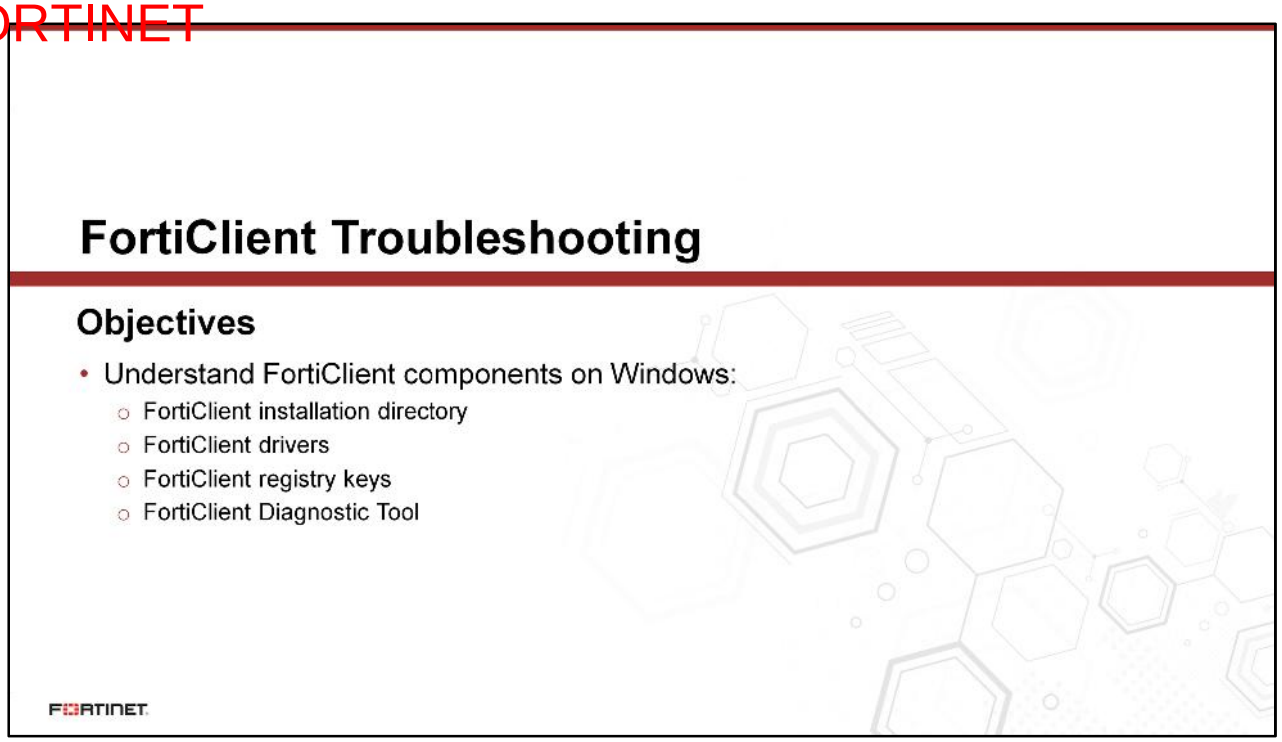
1. Which method does FortiClient choose first for automatic registration?
   - A. Default gateway IP (FortiGate's IP)
   - ✓ B. Telemetry gateway IP list
2. Which device specifies on-net/off-net status in versions earlier than 6.0?
   - A. FortiClient EMS
   - ✓ B. FortiGate

FORTINET



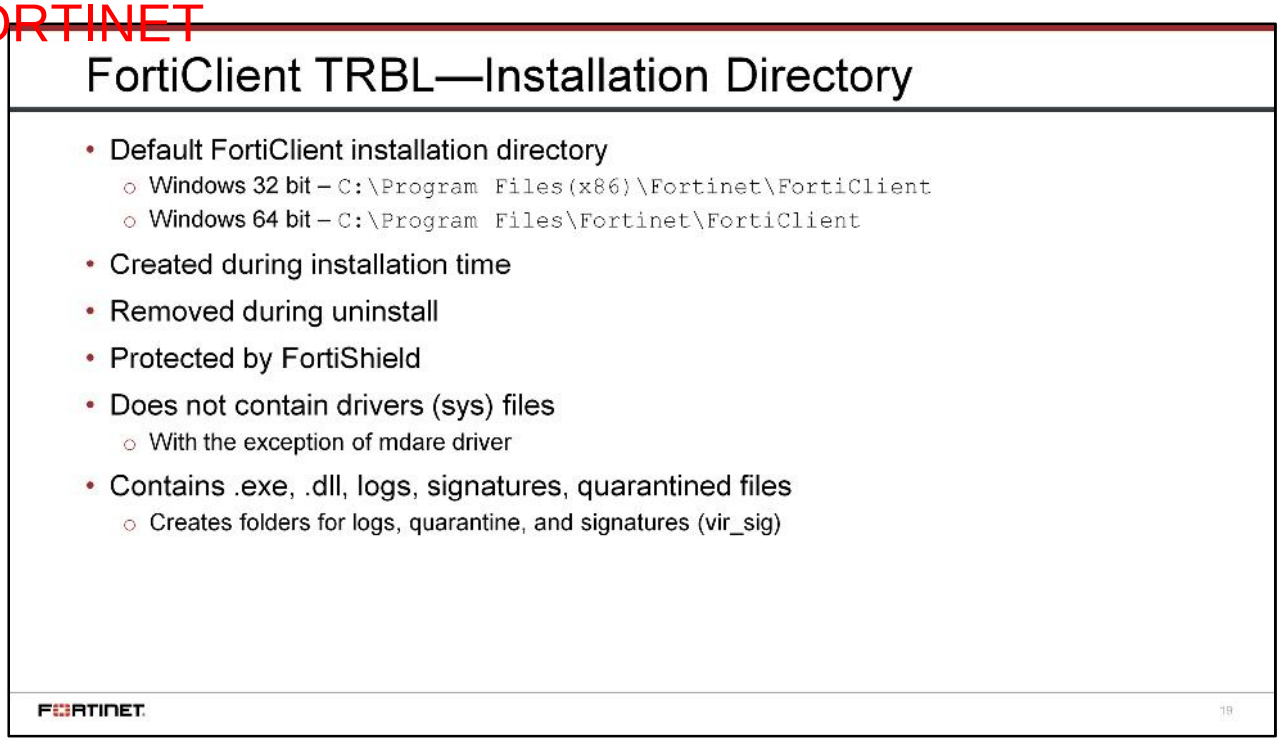
Good job! You now understand the diagnostics steps to resolve common issues between FortiClient and FortiClient EMS.

Now, you will learn about FortiClient components and troubleshooting.



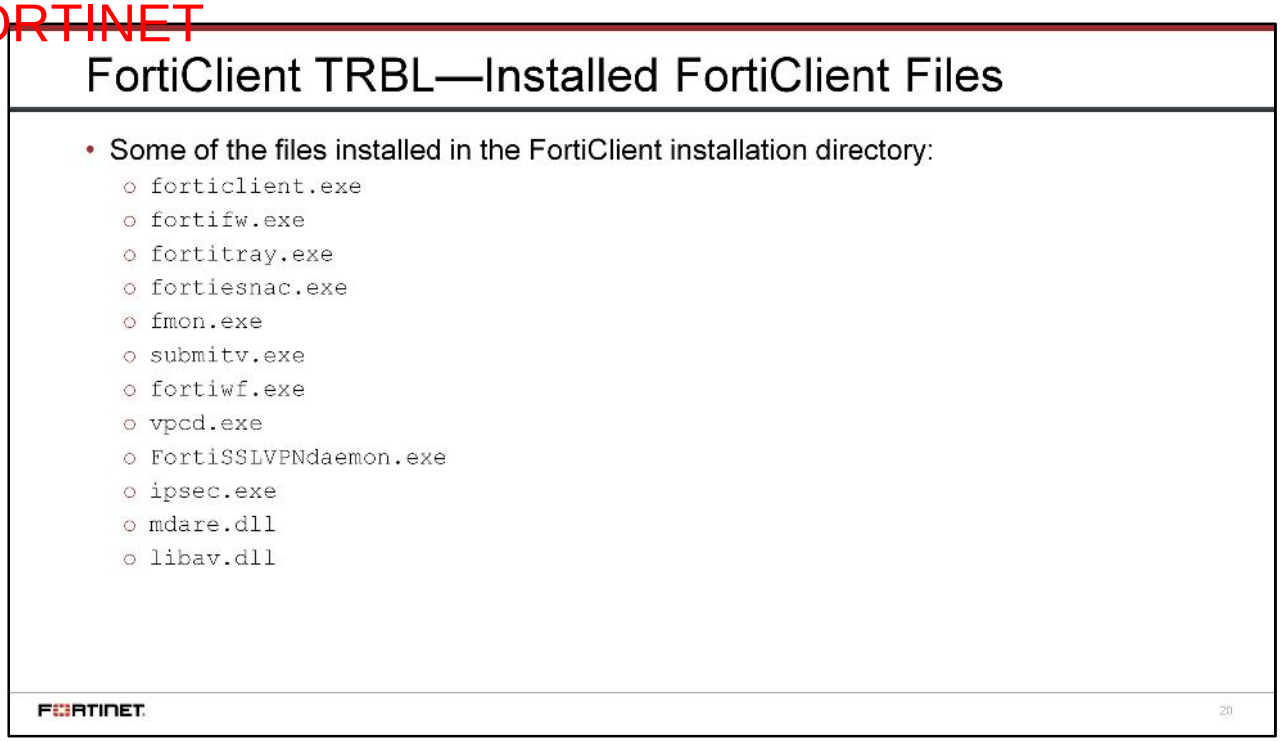
After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in FortiClient components and troubleshooting, you will be able to resolve issues on Windows operating systems.



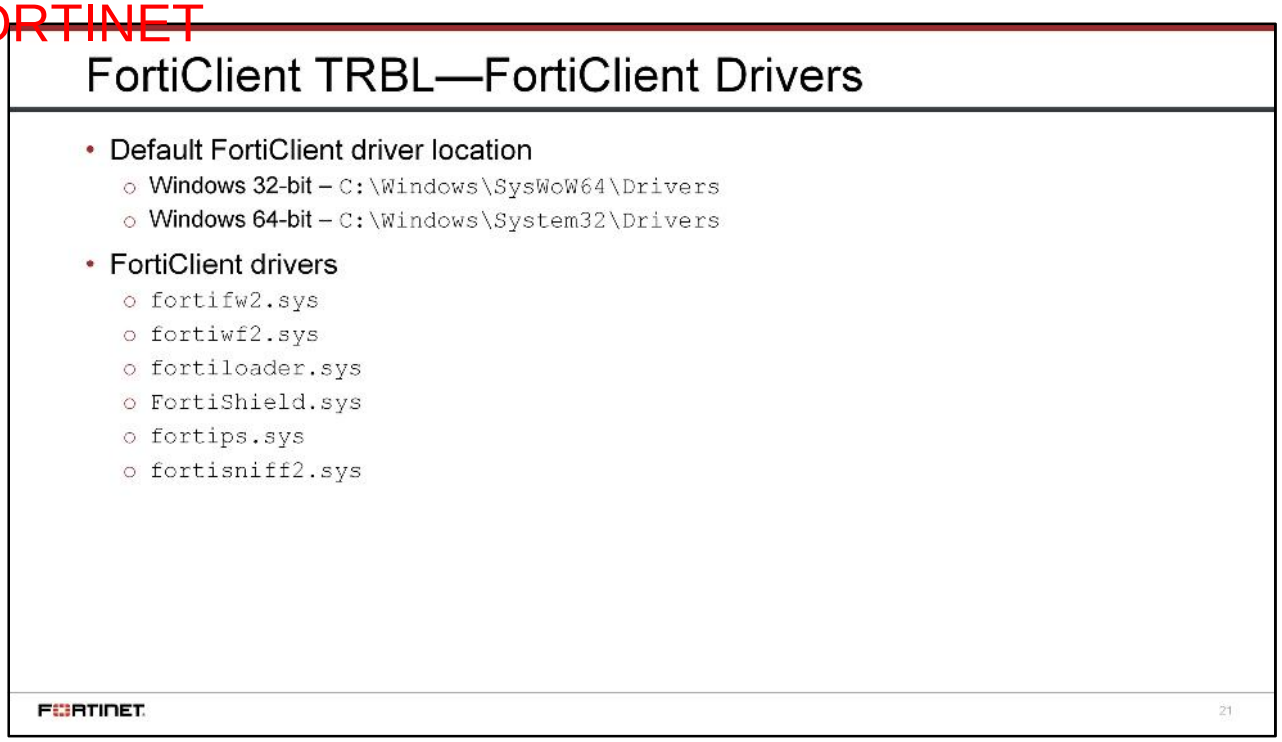
When FortiClient is installed on Windows OS, by default it is installed in `Program Files` on Windows 32-bit OS, and `Program Files (x86)` in Windows 64-bit OS. The FortiClient directory is created only during installation and removed during uninstallation.

You can change the default installation directory while installing FortiClient. FortiClient is protected by FortiShield, which is digitally signed and prevents modification of the Windows registry. The FortiClient folder contains .exe, .dll, logs, signatures, and quarantine files, and so on.



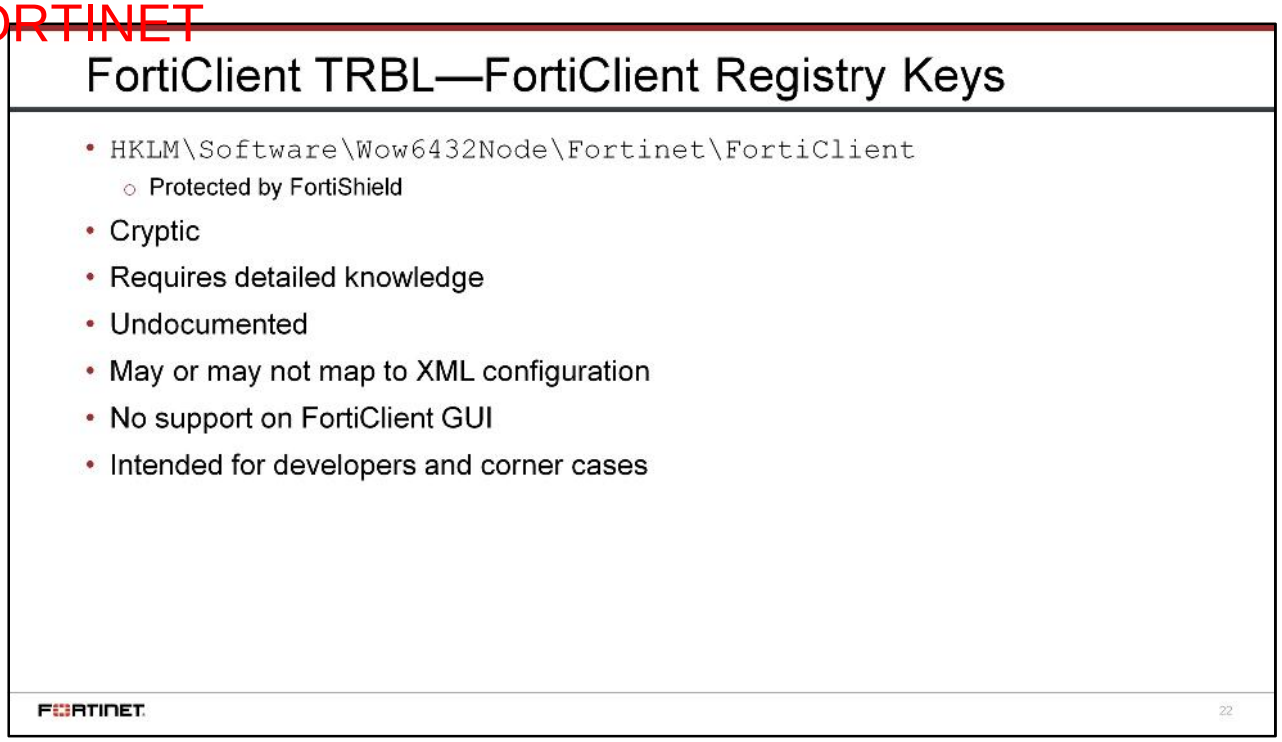
When you install FortiClient, it installs a number of executables, dll, signatures, and so on, which includes:

- `forticlient.exe` – FortiClient GUI (FortiClient console)
- `fortifw.exe` – FortiClient personal firewall service
- `fortitray.exe` – FortiClient system tray controller
- `fortiesnac.exe` – Handles the endpoint control
- `fmon.exe` – FortiClient real-time file system monitor (FortiClient Realtime Anti-Virus Protection)
- `submitv.exe` – FortiClient virus submit daemon (FortiClient Virus Feedback Service)
- `fortiwf.exe` – FortiClient web filtering service
- `vpcd.exe` – FortiClient VPN policy retriever
- `FortiSSLVPNdaemon.exe` – FortiClient SSLVPN daemon
- `ipsec.exe` – FortiClient VPN Service
- `mdare.dll` – FortiClient malware detection and removal engine (malware detection and removal engine)
- `libav.dll` – Fortinet AV engine library (AV Engine Library)



When FortiClient is installed on Windows OS, it installs the necessary drivers on Windows 32-bit OS and Windows 64-bit OS, which includes:

- `fortifw2.sys` – FortiClient app firewall driver
- `Fortiwf2.sys` – FortiClient web filter driver
- `fortiloader.sys` – FortiClient fortiloader driver
- `FortiShield.sys` – FortiClient file system filter driver
- `Fortips.sys` – FortiClient IPsec driver
- `fortisniff2.sys` – FortiClient IPS driver

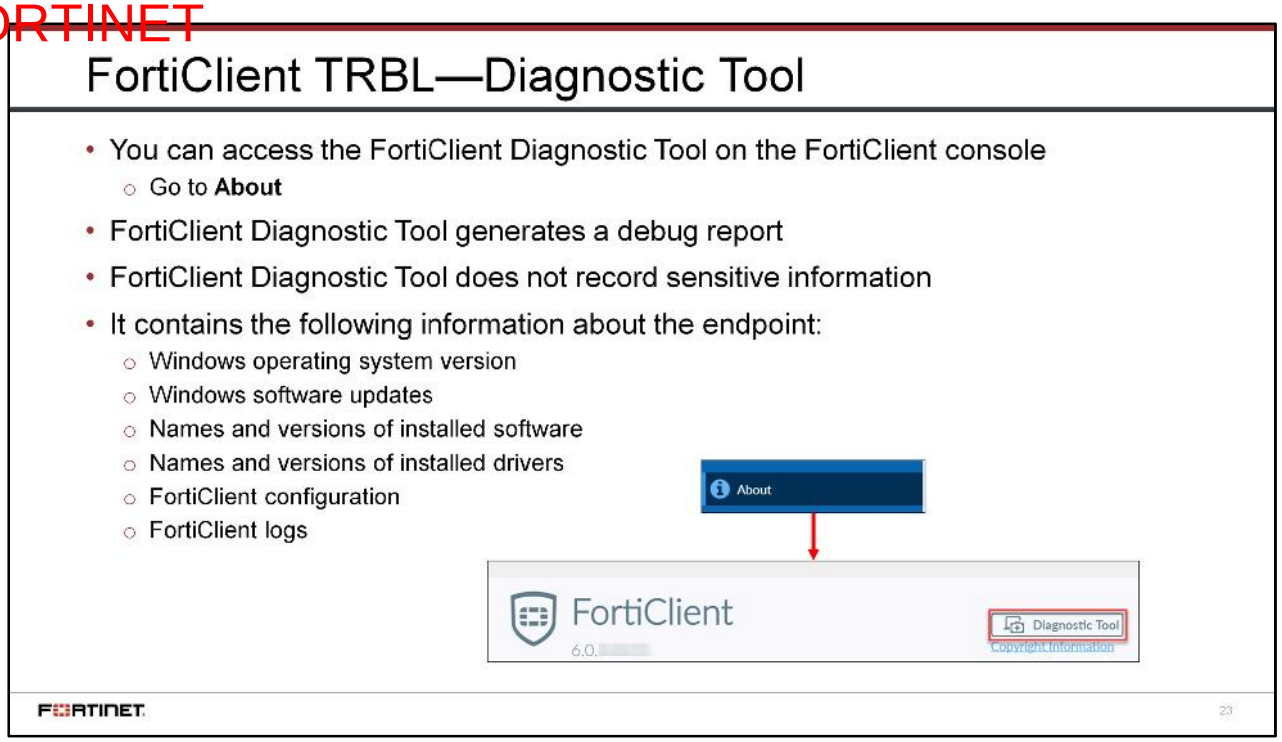


You can check the FortiClient registry keys at `HKLM\Software\Wow6432Node\Fortinet\FortiClient`. The registry keys are protected by **FortiShield**.

Unlike XML, registry keys are cryptic and the user requires detailed knowledge to configure. The keys can't be documented in any format and hence are not supported on the FortiClient GUI. The keys are intended for use by developers.

Note that in some cases Fortinet support can ask you to change the FortiClient registry or replace FortiClient files. To perform this task you must stop FortiShield first:

- Shutdown FortiClient
- In an elevated command-line window, type sc stop fortishield



You can use the FortiClient Diagnostic Tool to generate a debug report, and then provide the debug report to the FortiClient team to help with troubleshooting. For example, if you are working with customer support on a problem, you can generate a debug report, and send the report to customer support to help with troubleshooting.

The FortiClient Diagnostic Tool does not record sensitive information. It contains information about the endpoint, such as:

- Windows operating system version
- Windows software updates
- Names and versions of installed software
- Names and versions of installed drivers
- FortiClient configuration
- FortiClient logs

FortiClient TRBL—Logs

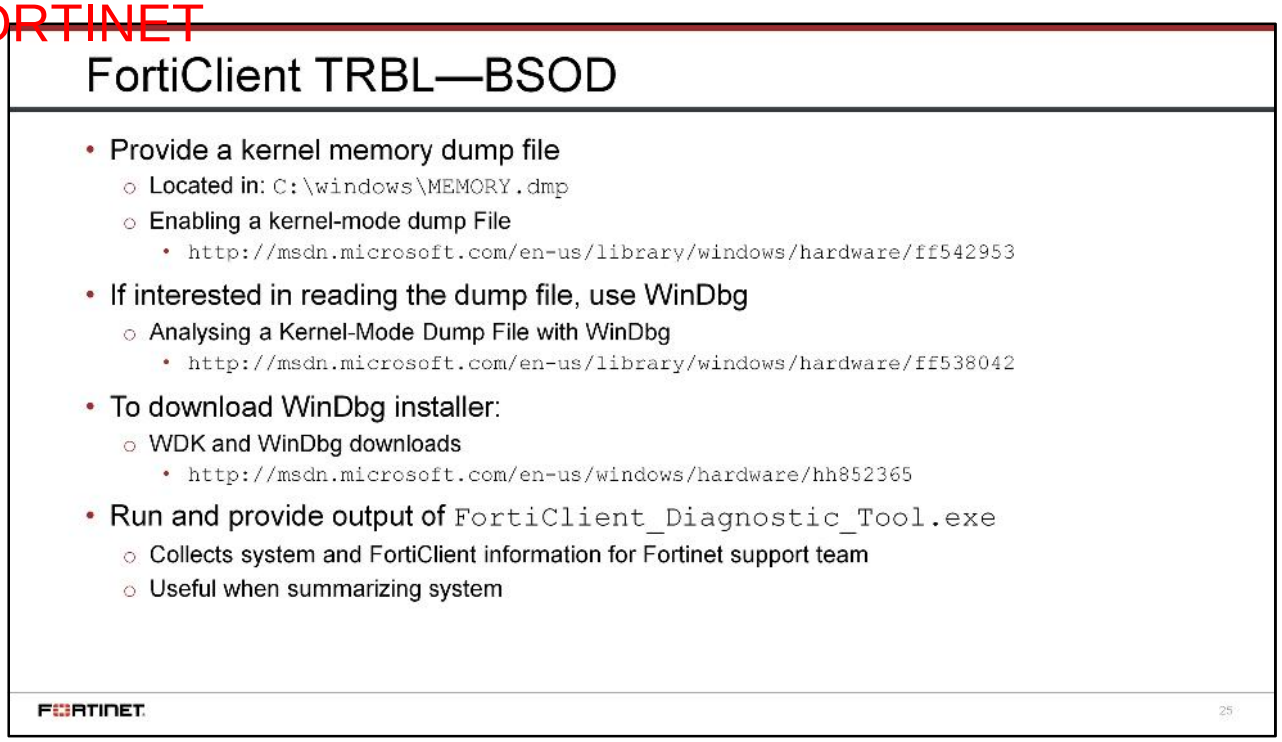
- You can export logs from FortiClient to review
- Change log level
- Default log level is **Information**

FORTINET 24

By default, the log level is set to **Information**, which provides enough related information to resolve common FortiClient issues. However, you can change the log level directly on FortiClient by clicking **Settings** > **Logging** > **Log Level** on a standalone FortiClient. In the case of a managed FortiClient (from FortiClient EMS), you can send the necessary configuration from **Endpoint Profile** > **System Settings** to FortiClient.

There are various log levels on FortiClient such as **Emergency**, **Alert**, **Information**, **Debug**, and so on. To get more detailed logs for debugging, change the log level to **Debug**.

Note that you can clear the check boxes next to feature(s) to reduce log entries when troubleshooting a specific feature issue.



FortiClient can cause blue screen of death (BSoD) when it conflicts with third-party software. If this happens, provide a kernel memory dump. It is usually located in `C:\windows\MEMORY.dmp`

To configure the collection of dump files, refer to the following Microsoft documents:

- Enabling a kernel-mode dump file:

  http://msdn.microsoft.com/en-us/library/windows/hardware/ff542953

- To reach the dump file, use WinDbg:

  http://msdn.microsoft.com/en-us/library/windows/hardware/ff538042

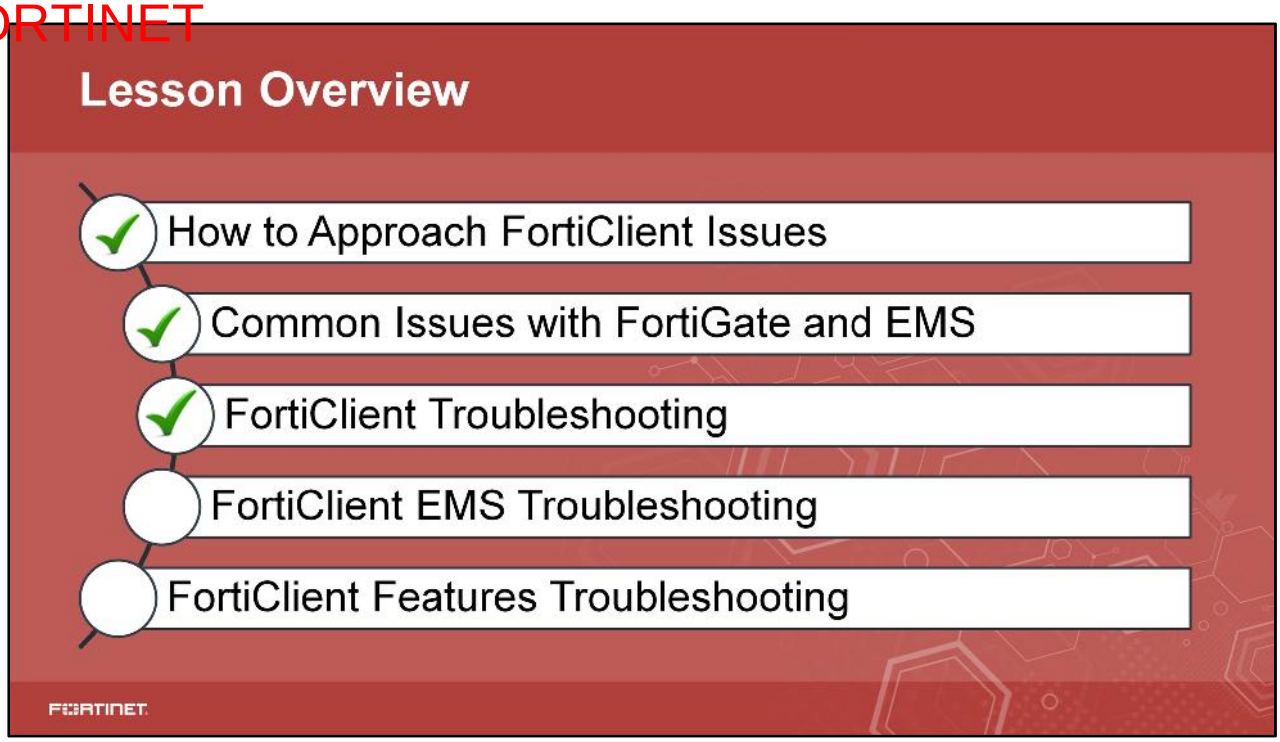
- To download the WinDbg installer:

  http://msdn.microsoft.com/en-us/windows/hardware/hh852365

Run and provide the output of `FortiClient_Diagnostic_Tool.exe`.

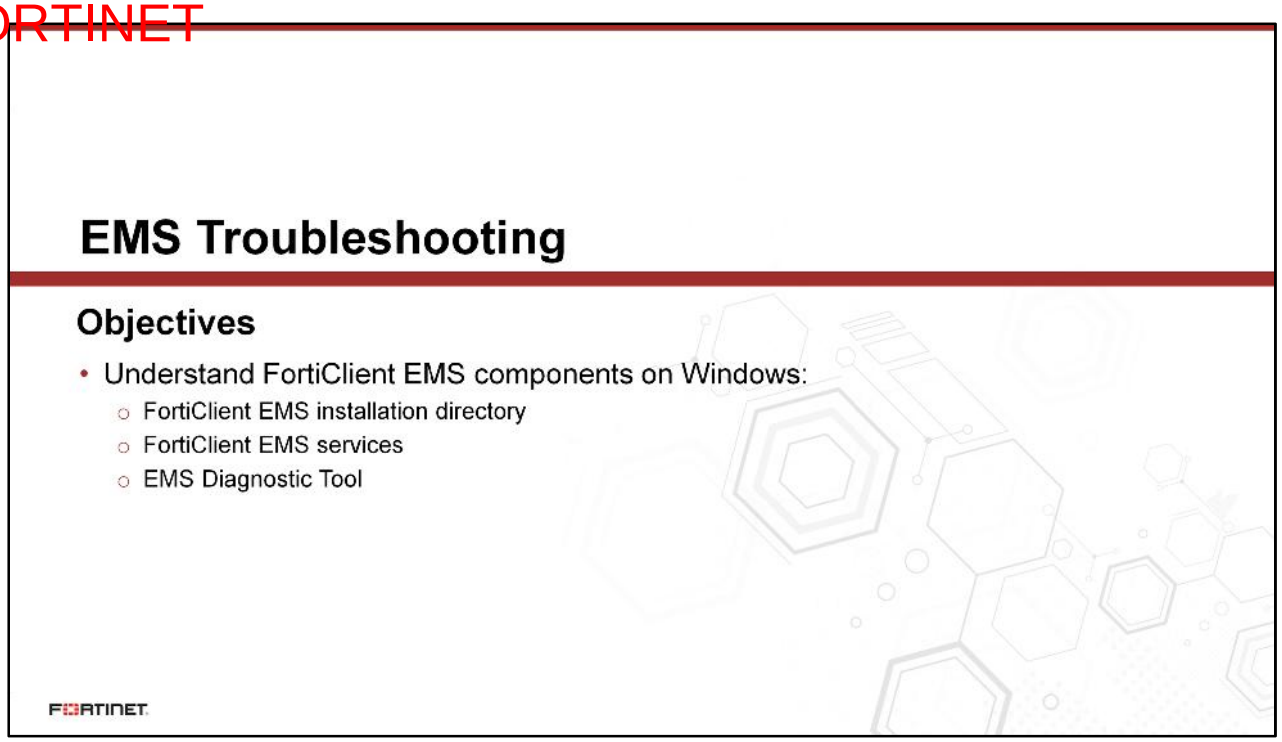
Knowledge Check

1. What protects FortiClient registry keys?
   - ✓ A. FortiShield
   - B. FortiProxy
2. What is default log level in FortiClient?
   - A. Warning
   - ✓ B. Information



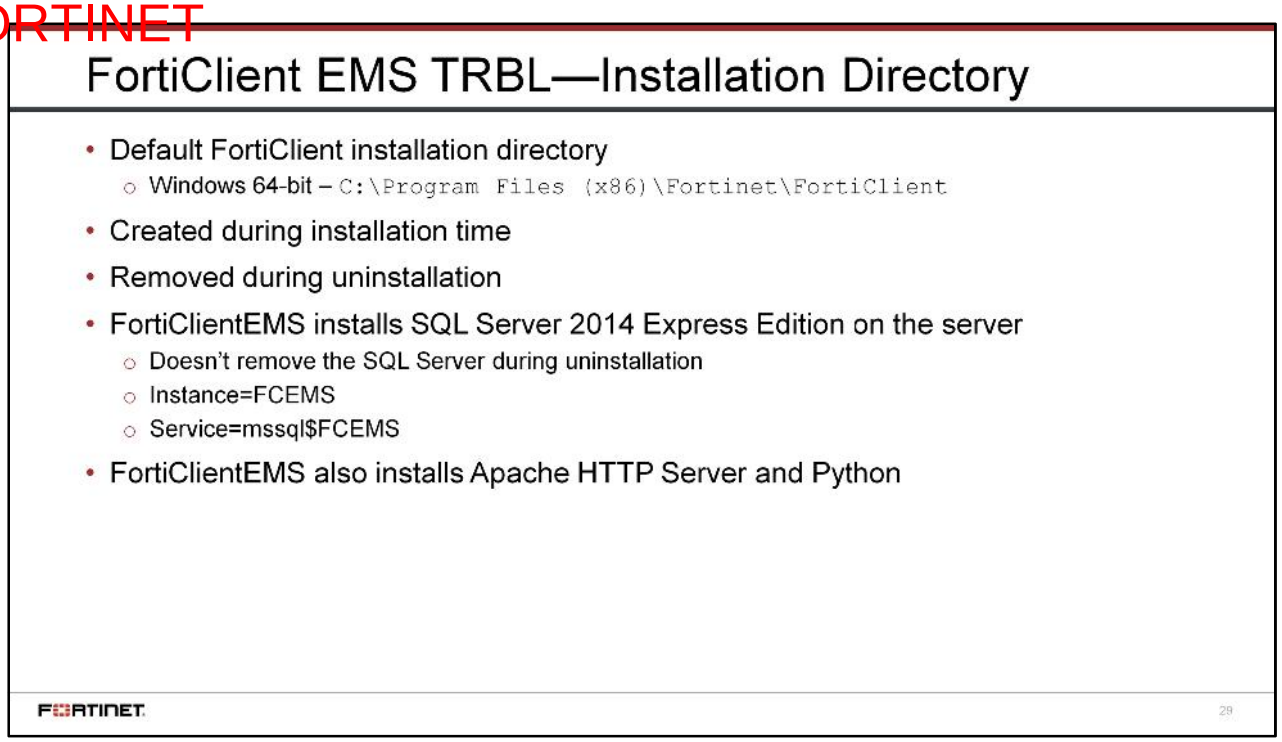
Good job! You now understand FortiClient components and troubleshooting on Windows operating systems.

Now, you will learn about FortiClient EMS troubleshooting.



After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in FortiClient EMS components and troubleshooting, you will be able to resolve EMS issues on Windows servers.

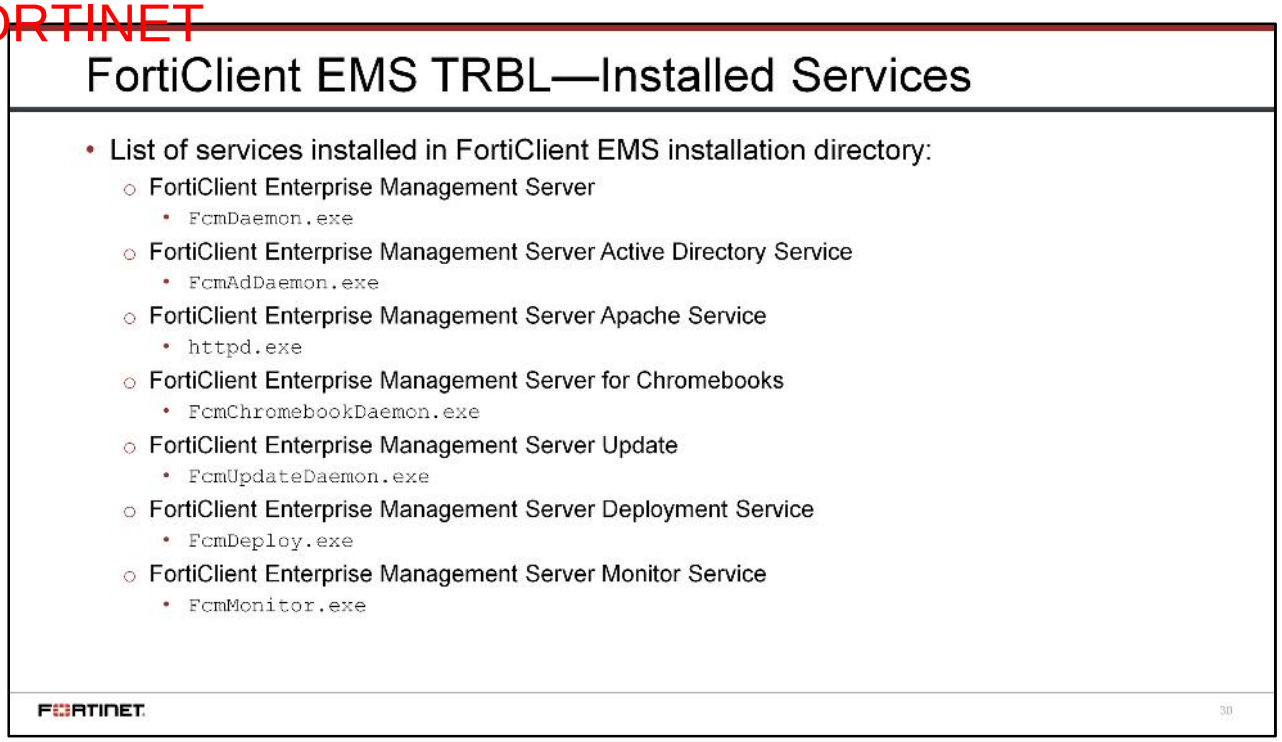


By default, FortiClient EMS is installed in Windows `Program Files (x86)` on the Windows 64-bit OS. The FortiClient EMS directory is created only during installation and is removed during uninstallation.

You can change the default installation directory while installing FortiClient EMS. FortiClient EMS installs SQL Server 2014 Express edition on the server. FortiClient EMS doesn't remove SQL Server during uninstallation.

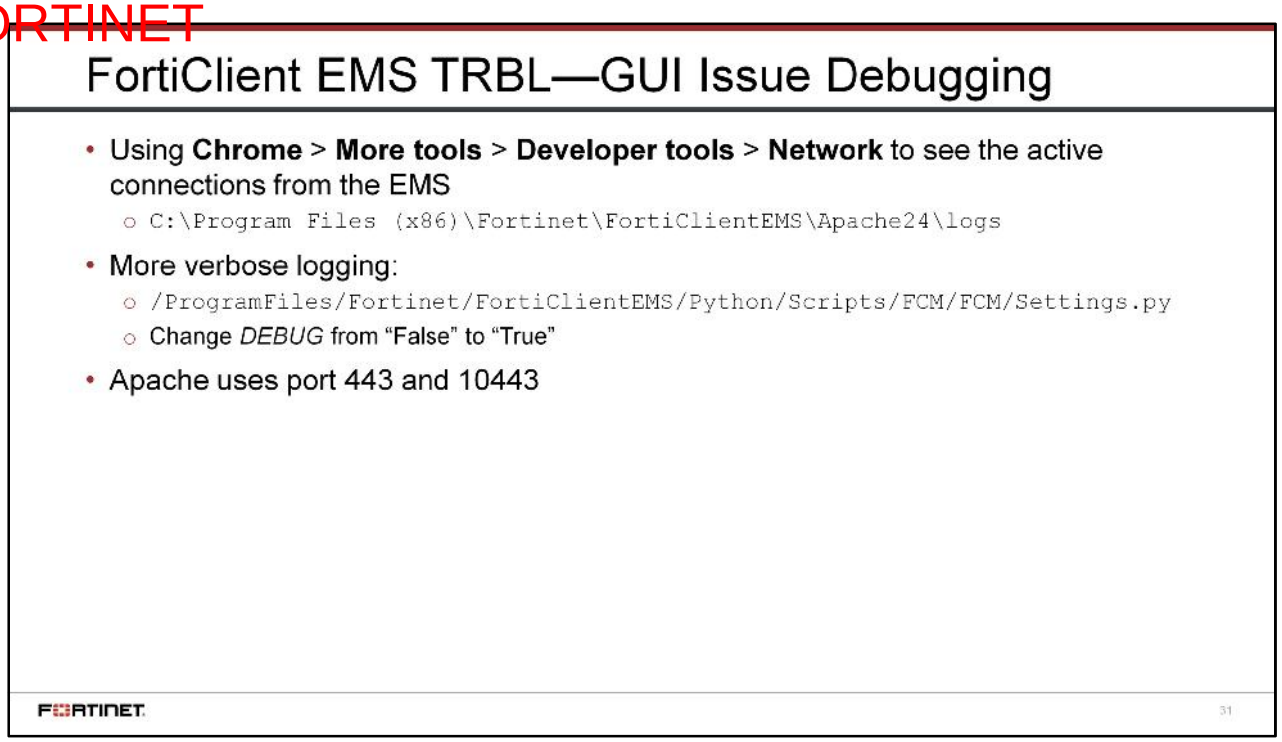
- Instance=FCEMS
- Service=mssql$FCEMS

FortiClient EMS also installs Apache HTTP Server and Python.



When you install FortiClient EMS, it installs a number of executables, dll, signatures, and so on, which includes:

- `FcmDaemon.exe`: For client connectivity/endpoint control/registration
- `FcmAdDaemon.exe`: For Active Directory groups
- `httpd.exe`: For EMS web console
- `FA_Scheduler`: Keeps track of all the EMS services and starts them when stopped
- `FcmChromebookDaemon.exe`: For Chromebooks management on FortiClient EMS
- `FcmUpdateDaemon.exe`: Connects to FortiGuard for updates
- `FcmDeploy.exe`: FortiClient deployment

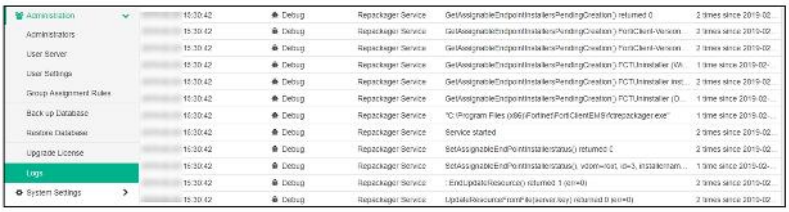


You can debug GUI access issues either by:
- Using a web browser
- Enabling verbose logging for Python

Make sure you turn off the debug after troubleshooting. You should not run the debug in a production environment. By default, apache uses port 443 and 10443. You can use `netstat` command to see if the default apache ports are being used by another application.

FortiClient EMS TRBL—View Debug Logs

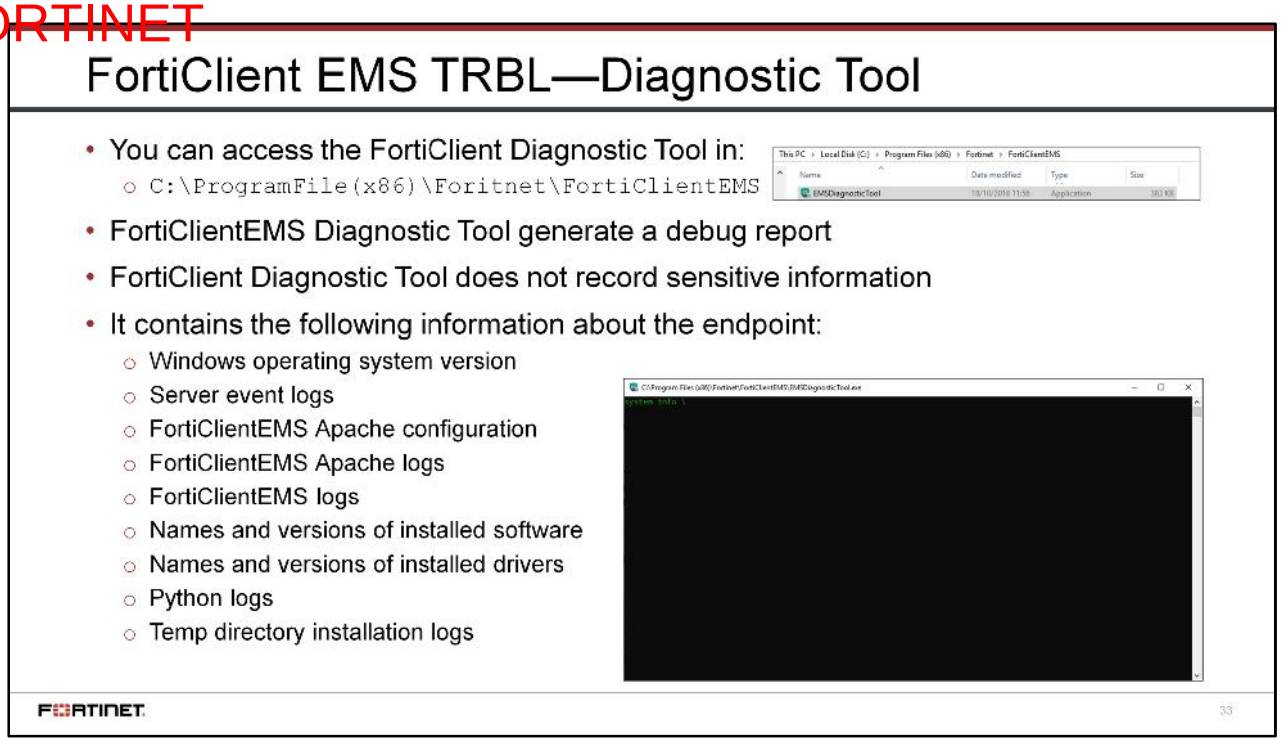
- You can check logs on FortiClient EMS GUI
  - **Administrator** > **Logs**
- Change log level to **Debug**



- However this doesn't include FortiClient EMS installation logs
- For FortiClient EMS installation issues go to:
  - `C:\Users\Administrator\AppData\Local\Temp\FortiClient_Enterprise`
- SQL Server installation logs
  - `%temp%\sql`

On FortiClient EMS, you can see the logs on **Administrator** > **Logs**. To get more information, you should to change the log level to **Debug**. However this GUI log doesn't include FortiClient EMS and SQL installation logs. Installation logs are generally available in the temp folder.

Note that FortiClient EMS automatically reverts the log level from **Debug** to **Info** after 30 minutes to save resources on server. EMS GUI only displays logs from database, daemon debug logs are sent to the file only.



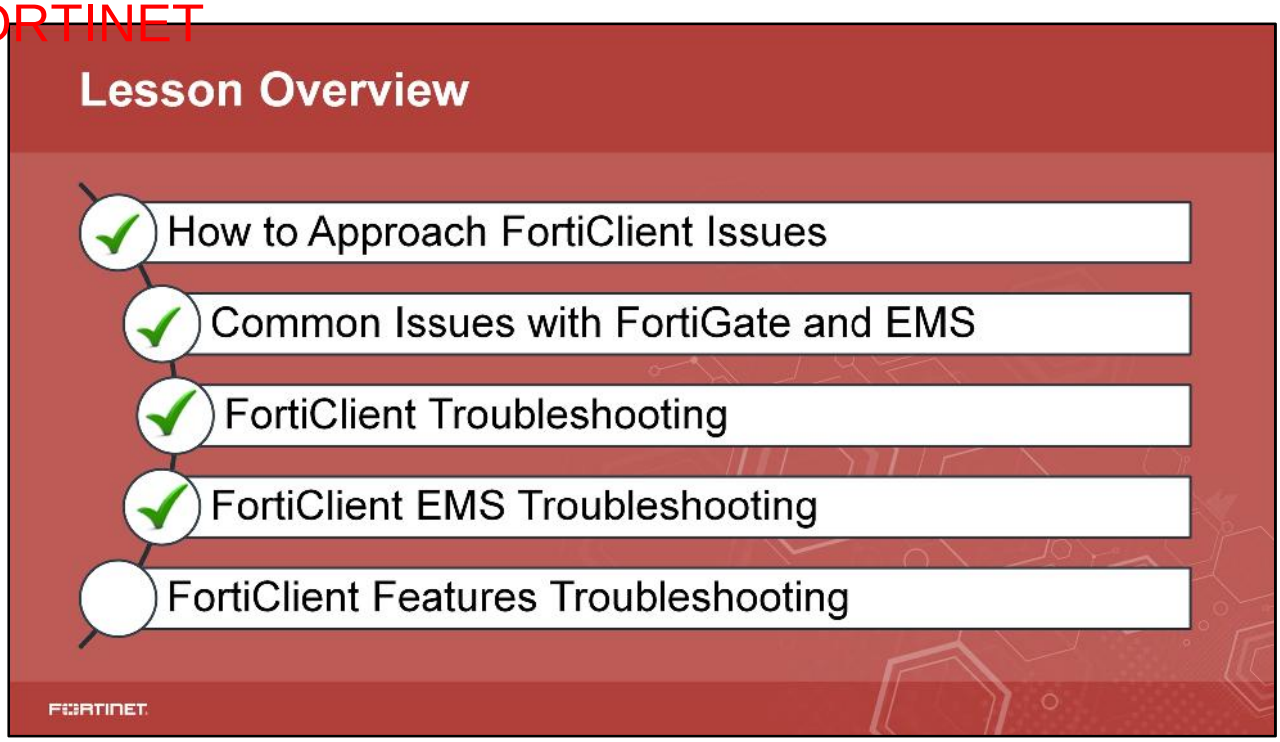
You can use the FortiClient EMS Diagnostic Tool to generate a debug report, and then provide the debug report to the FortiClient team to help with troubleshooting. For example, if you are working with customer support on a problem, you can generate a debug report, and send the report to customer support to help with troubleshooting.

The FortiClientEMS Diagnostic Tool does not record sensitive information. It contains information about the endpoint, such as:

- Windows operating system version
- Server event logs
- FortiClient EMS Apache configuration
- FortiClient EMS Apache logs
- FortiClient EMS logs
- Names and versions of installed software
- Names and versions of installed drivers
- Python logs
- Temp directory installation logs

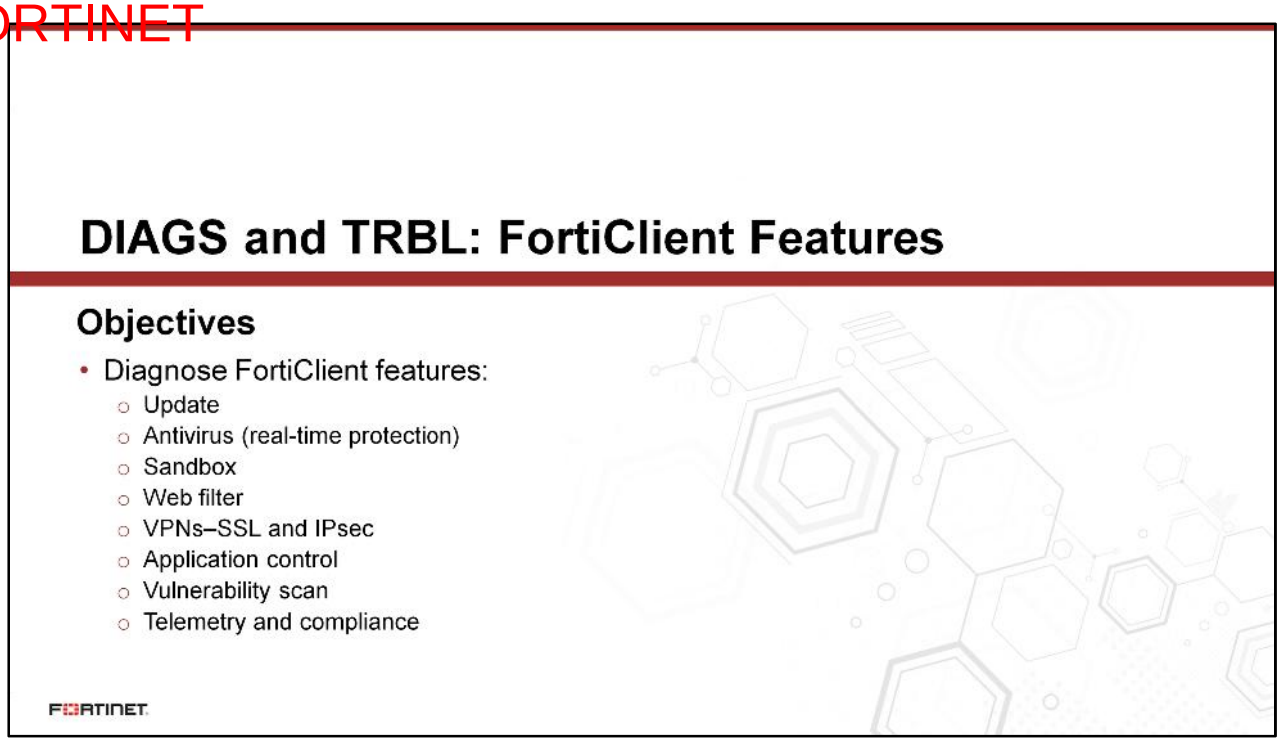
Knowledge Check

1. Which database is installed with the EMS installation?
   - A. Oracle
   - ✓ B. Microsoft SQL Server
2. Which process is responsible for the EMS web console?
   - A. `FcmDaemon.exe`
   - ✓ B. `httpd.exe`



Good job! You now understand FortiClient EMS components and troubleshooting on Windows Servers systems.

Now, you will learn about diagnosing and troubleshooting FortiClient features.

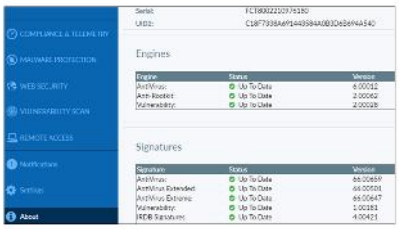


After completing this section, you should be able to achieve the objectives shown on this slide.

By demonstrating competence in diagnosing FortiClient features, you will be able to resolve issues related to individual features.

FortiClient Features—Updates

- Verify on FortiClient console for latest updates
  - On left pane, click **About**
  - Run manually in an elevated command line window
    - `update_task.exe -s fd_01`
- Registry
  - FA_UPDATE
  - FA_Scheduler\00003
- Check XML configuration
  - `<forticlient_configuration> <system> <update>`
  - Check custom servers if defined
    - Backup server
    - Failover to FDN
  - Schedule update



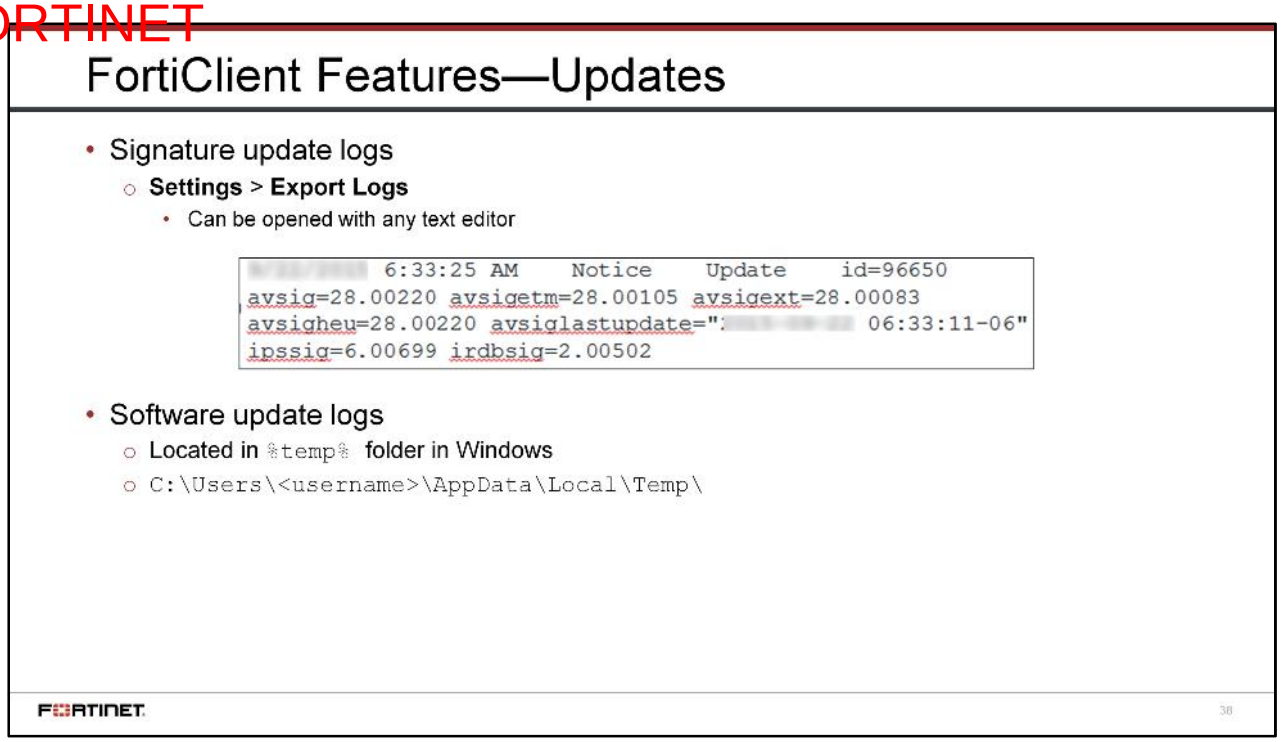
The FortiClient console provides the latest information regarding engine and software statuses and versions used by FortiClient. To check the latest updates on FortiClient, click **About**.

By default, the value for `<use_custom_server>` is 0, which means it is disabled, failover backup servers are not defined, and failover to public FDN is enabled. In this case, FortiClient will first attempt to connect to the public FortiClient server forticlient.fortinet.net or `myforticlient.fortinet.net` over TCP port 80 to download the list of secondary servers from which it will then download the signatures and packages for FortiClient.

If a string is specified in `<server>` and communication fails with that server, each of the servers specified in `<fail_over_servers>` are tried until one succeeds. If that also fails, then software updates will not be possible unless `<fail_over_to_fdn>` is set to 1. If communication fails with the server(s) specified in both `<server>` and, `<fail_over_servers>`, `<fail_over_to_fdn>` specifies the next course of action.

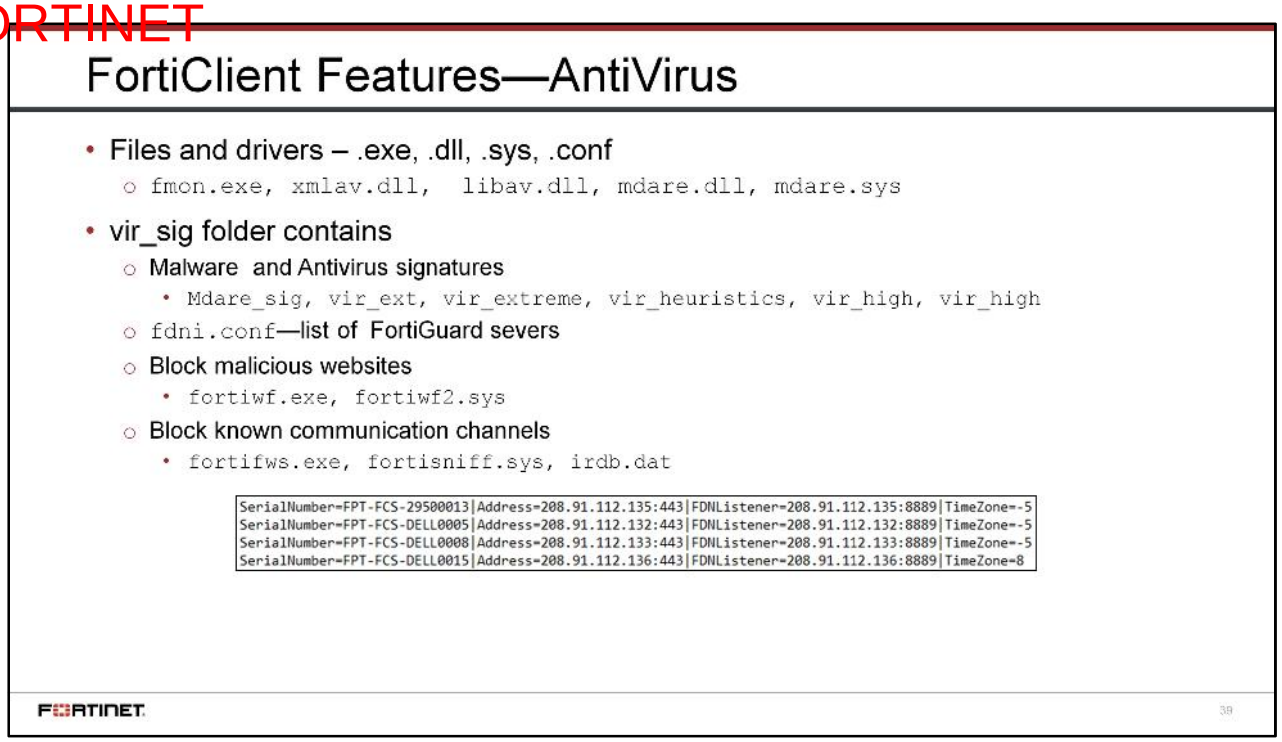
You should leave the default value of `<fail_over_to_fdn>` set to 1.

By default, scheduled updates are enabled at an intervals, this specifies the frequency that FortiClient checks for updates. A network error will cause an update failure, and the temporary AV signatures keep growing. Run the update_task command manually.

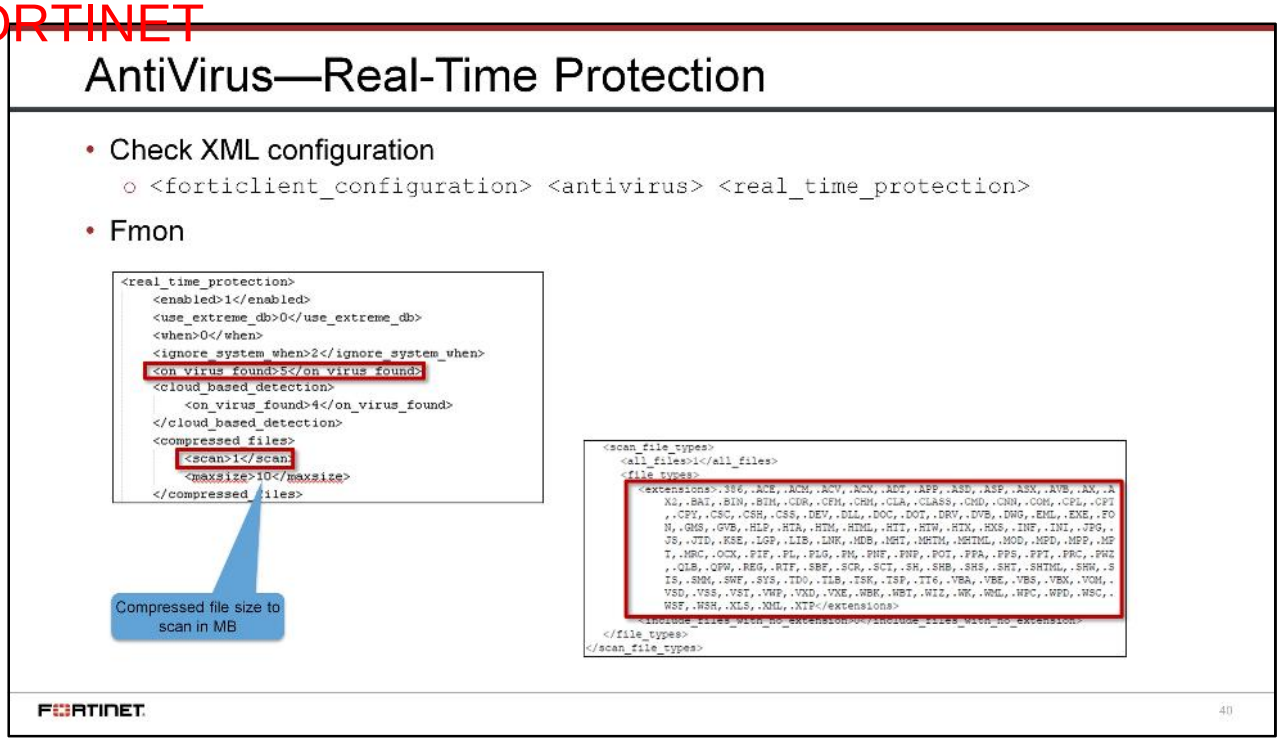


The signature update logs provide the date and time of the update along with the version number of the signatures. To export the logs to a local computer from FortiClient, click **Settings** > **Export Logs**. Based on the logging level and log types enabled it will export all types of logs.

The software update logs are located in the `%temp%` folder in Windows, which might be a hidden folder.



FortiClient requires a number of files and drivers in order to perform a real-time antivirus scan which includes exe, dll, sys, and conf files, and are located in Installation directory\Fortinet\FortiClient\ folder. The vir_sig folder contains malware and antivirus signatures along with the fdni.conf file which contains a list of public FortiGuard servers that FortiClient contacts to get updates on the signatures and packages.



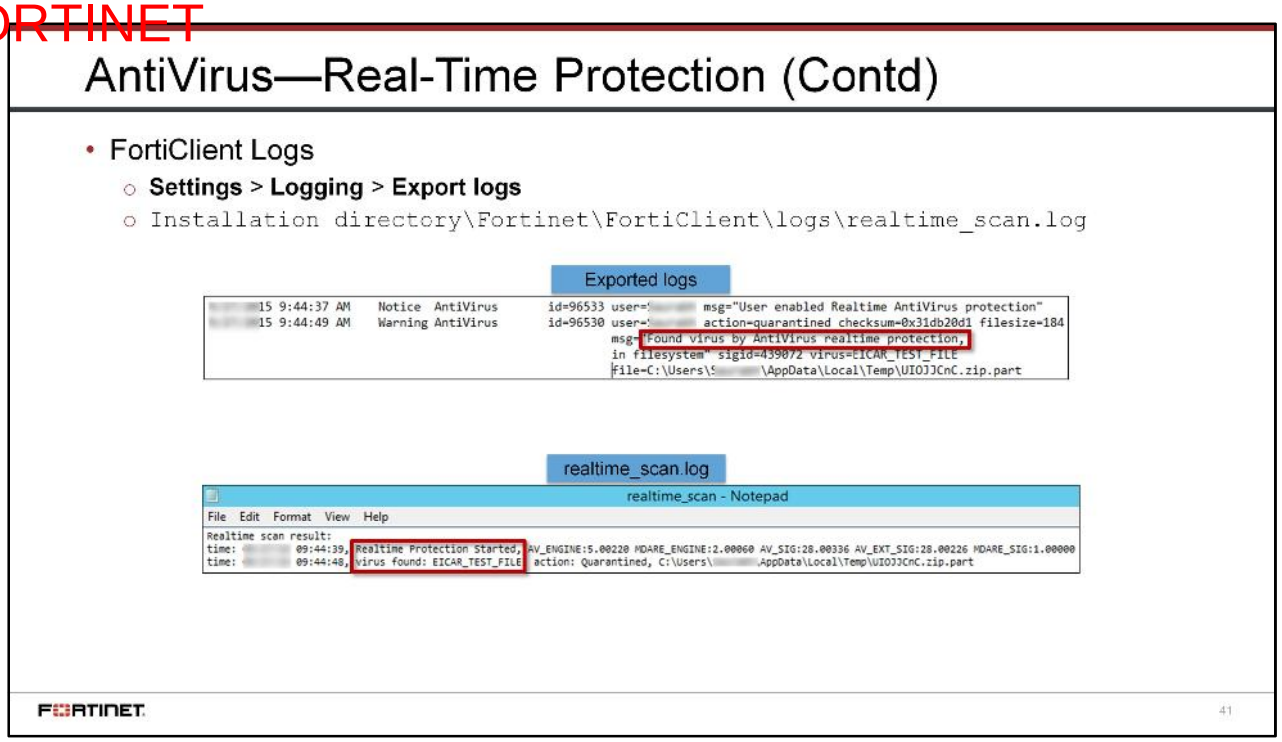
It is very important to check the XML configuration if the real-time antivirus protection is not functioning properly. By default, when a virus is found, FortiClient quarantines the file. There are five levels of `<on_virus_found>` XML configuration tags:

- 0: clean
- 1: ignore
- 2: repair
- 3: warning
- 4: quarantine
- 5: deny access

FortiClient also performs a scan on the compressed files and allows you to define the compressed file size to scan up to 65535MB. 0 means no limit. FortiClient performs a real-time scan on a wide range of extensions and allows you to modify the list of extensions to scan.

For example, if you set the value of the `<on_virus_found>` XML configuration tag to 1, it will ignore the virus file and the virus will not be caught. Another example is if you modify and remove a few extensions from the `<extensions>` XML configuration element and if the suspicious file extension is not listed in the `<extensions>` XML configuration element, it will be not caught.

Note that this partial XML configuration is for a real-time antivirus. For a complete list of available XML configuration elements, refer to the *FortiClient 6.0.0 XML Reference guide* available at `http://docs.fortinet.com`.



The antivirus logs provides the date and time of the real-time antivirus scan along with the action taken, virus, and location of the file. To export the logs to a local computer from FortiClient, click **Settings** > **Logging** > **Export Logs**.

Based on the logging level and log types enabled, **Export Logs** will export all types of logs.

The realtime_scan.log located in Installation directory\Fortinet\FortiClient\logs\realtime_scan.log provides more detailed information regarding malware and antivirus engines and signatures used in the real-time antivirus scan along with name of the virus file, action taken, and location of the file.

Debug: Command line - In an elevated command line window:

- Disable RTP from the GUI OR shut down FortiClient
- Change directory into FortiClient installation directory `fmon.exe -s -fd_1`

There are other security risks that are handled by real-time protection:

Sandbox signatures:

- FortiClient uses sandbox signatures to identify the threat.

Block malicious website:

- Block access to malicious websites. The web filter module must be installed before you can enable this protection.

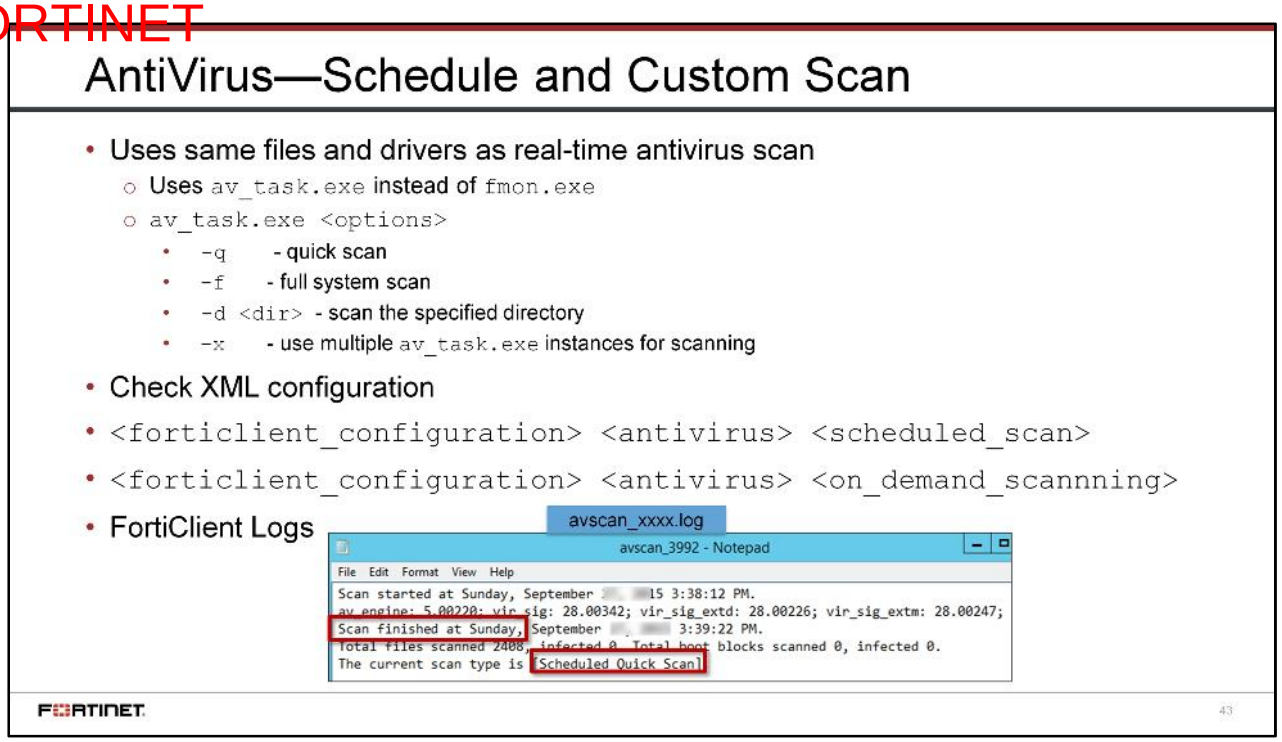
Block known attack communication channels:

- Select to block known communication channels used by attackers. The application firewall module must be installed before you can enable this protection.

Email protection:

- Scans email for malicious files. Support POP3 and SMTP.

You can use Boolean values to enable or disable real-time protection features. For example, `<block_malicious_websites>0</block_malicious_websites>` will disable blocking of malicious websites.



The scheduled and custom scan uses the same real-time antivirus files and drivers except it uses `av_task.exe` instead of fmon.exe.

- `av_task.exe -f`
- `av_task.exe -d c:\users`

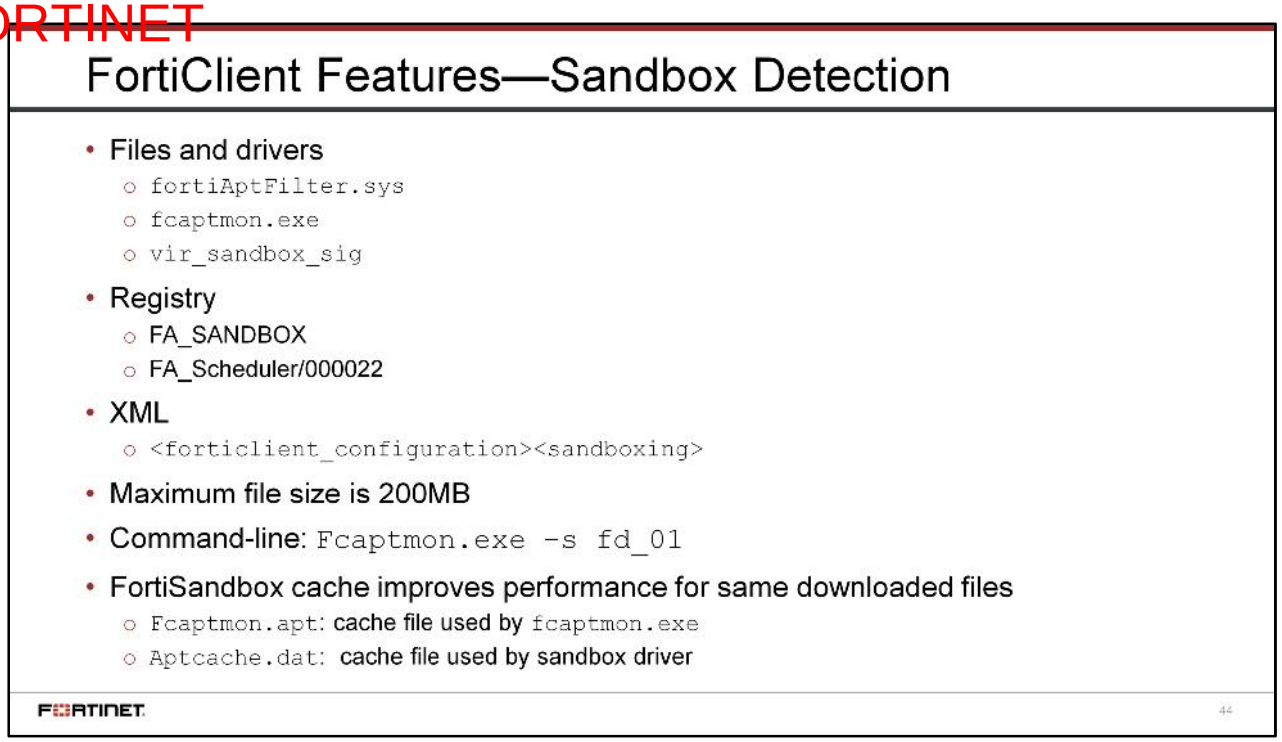
The factory default at the time of installation is to run a full system scan on the first day of the month at 18:30 hours and it also scans removable media. The following is part of the partial default XML configuration for a full system scan which can be modified.

```
<full>
<enabled>1</enabled>
<repeat>1</repeat>
<day_of_month>1</day_of_month>
<time>18:30</time>
<removable_media>1</removable_media>
<network_drives>0</network_drives>
<priority>0</priority>
</full>
```

By default, the priority of the scan is set to normal and has three different levels:

- 0: normal
- 1: low
- 2: high

The <on_demand_scanning> element defines how the antivirus scanner handles the scanning of files manually requested by the end user. The scheduled and on-demand scan logs are located in Installationdirectory\Fortinet\FortiClient\logs\av_scanxxxx.log



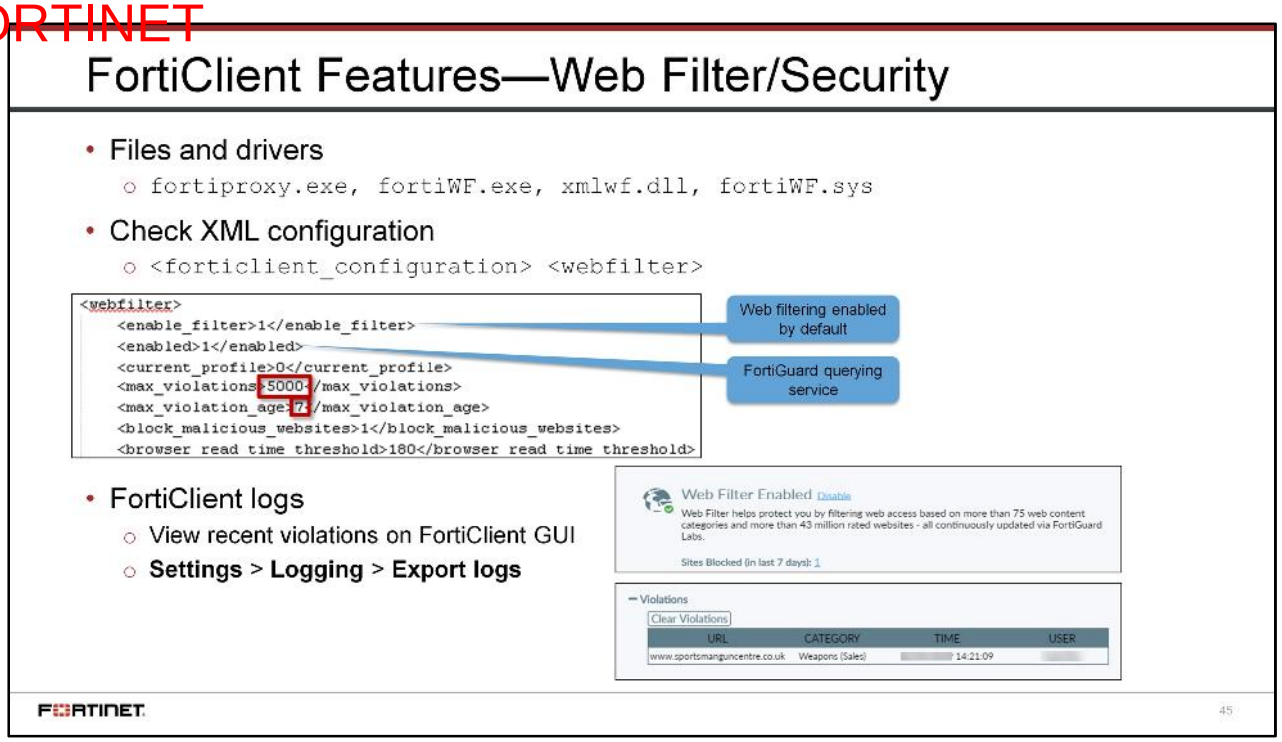
The FortiClient requires a number of files and drivers in order to perform file submission to FortiSandbox. The `vir_sanbox_sig` folder contains malware and antivirus software. The maximum file size you can submit from FortiClient to FortiSandBox is 200MB.

Files can be submitted from the following sources:

- Removable media
- Mapped network drives
- Web downloads
- Email download

You can run a sandbox debug by entering the CLI command Fcaptmon.exe –s fd_01 in an elevated command-line window.

FortiSandbox also caches files to improve performance.

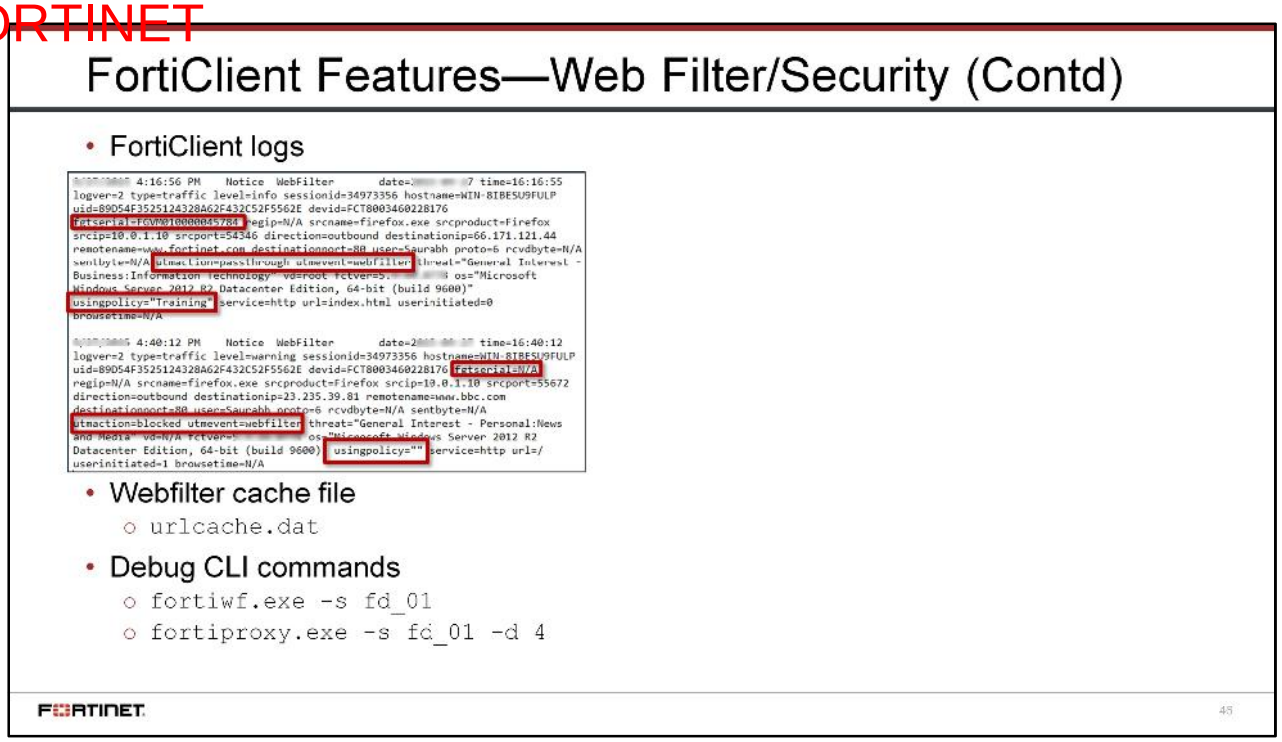


FortiClient requires a number of files and drivers in order to perform web filtering. By default, web filtering and the FortiGuard querying service is enabled and can store up to 5000 violations for a period of seven days. The default value for `<max_violations>` is set to 5000 and can be ranged from 250 to 5000, and `<max_violation_age>` is set to seven days and can be ranged from 1 to 90 days.

You can also configure safe search and the YouTube education filter under the `<safe_search>` and `<youtube_education_filter>` XML elements.
For complete list of available XML configuration elements, refer to the *FortiClient 6.0.0 XML Reference guide* available at http://docs.fortinet.com

Safe Search: Safe Search is a feature of Google search that acts as an automated filter of pornography and potentially offensive content. In the upcoming release of FortiClient we will have the ability to modify the host file to force all Google or Youtube traffic to connect to safe search websites such as **WackySafe** that only delivers safe search results. Drawback is that this will affect all Google services, such as search, Youtube, and so on.

You can view the web filtering violation logs directly on the FortiClient GUI or export the logs by clicking **Settings** > **Logging** > **Export logs**.



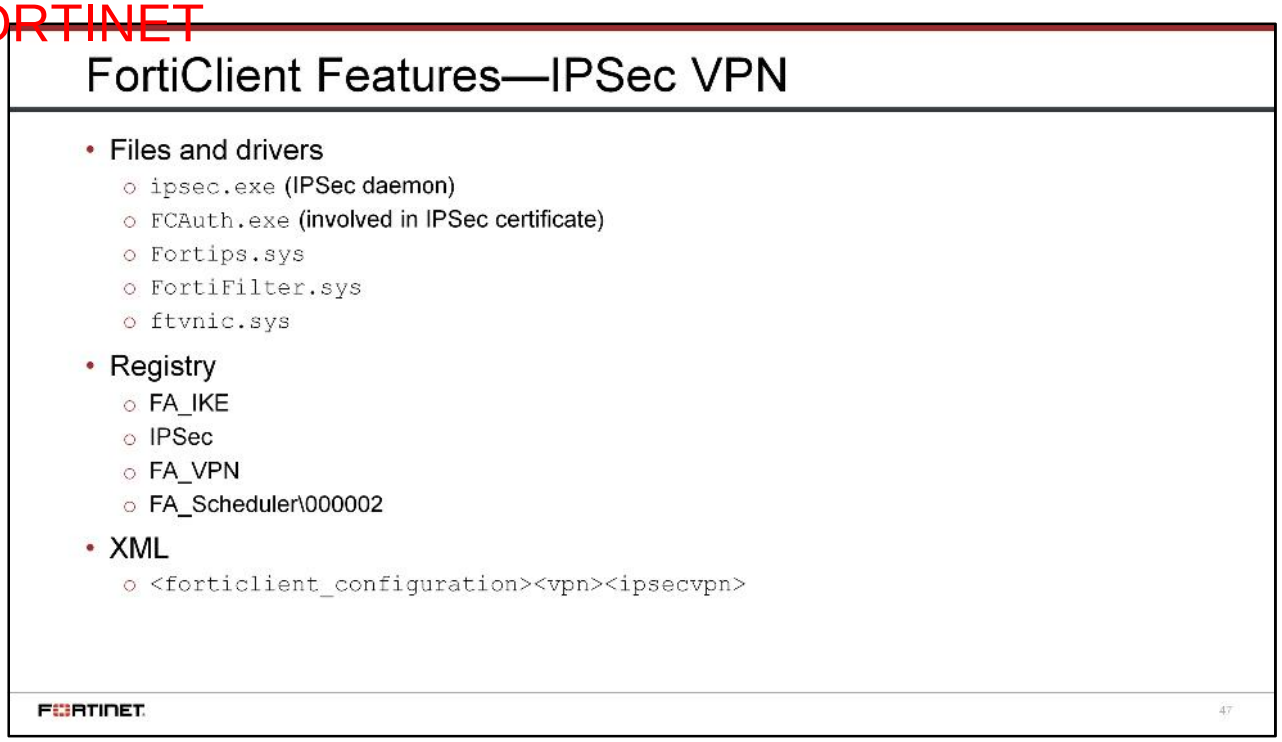
In the example shown on this slide, the first log entry is from a FortiClient that is managed by EMS and FortiGate (integrated mode). The managed FortiClient log will show the FortiGate serial number along with the name of the FortiClient profile it is using, and other details such as utmaction, utmevent, and so on.

The second log entry is from the standalone FortiClient, which doesn't have the information regarding the FortiGate serial number and policy.

So, when diagnosing and troubleshooting web filtering issues, always pay attention to the logs because the URL or category might be blocked in the managed profile, and not in the standalone profile, and the results might be different than what you were expecting.

The webfilter cache URL rating results in the `urlcache.dat` file. You can also run the following CLI commands in elevated mode to further troubleshoot webfilter issues:

- `fortiwf.exe -s fd_01`
- `fortiproxy.exe -s fd_01 -d 4`

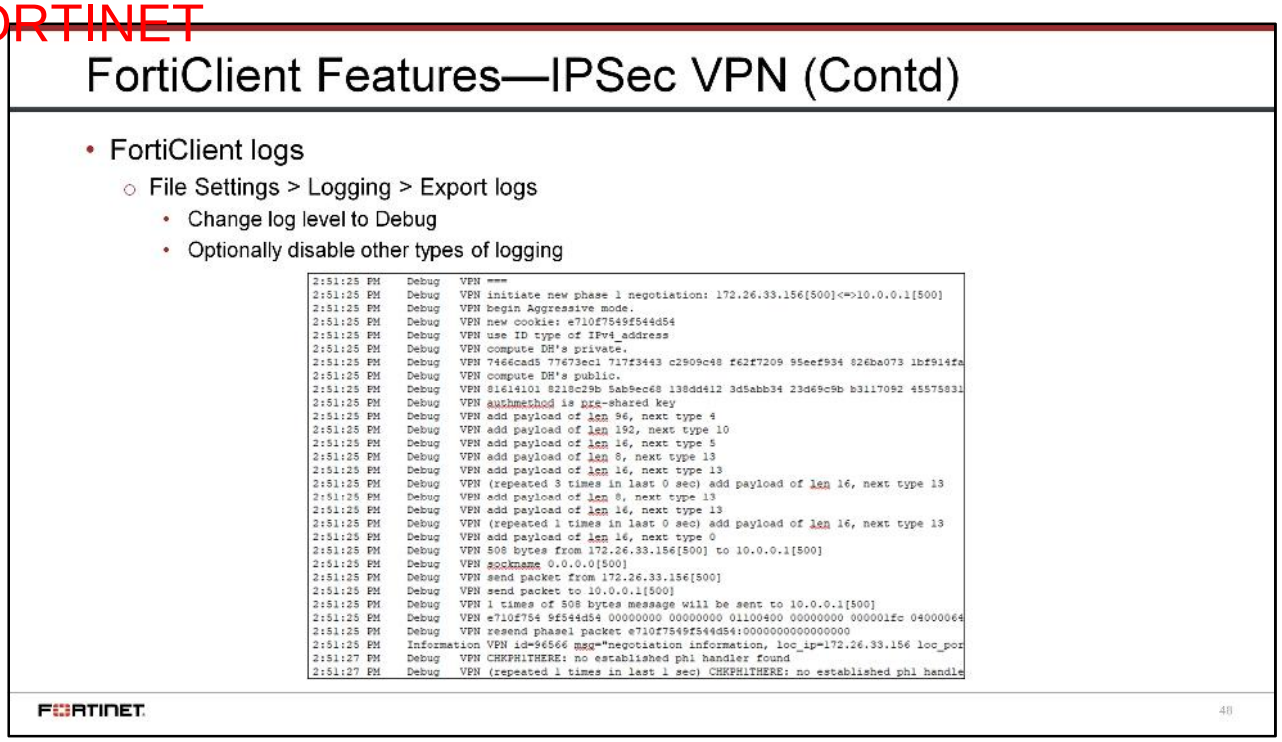


FortiClient requires a number of files and drivers for IPSec VPN.
The VPN-related information is contained inside the `<VPN> </VPN>` XML tags. The `<options>` XML tag contains global options that apply to both SSL VPN and IPsec VPN:

```
<forticlient_configuration><vpn><options>
```

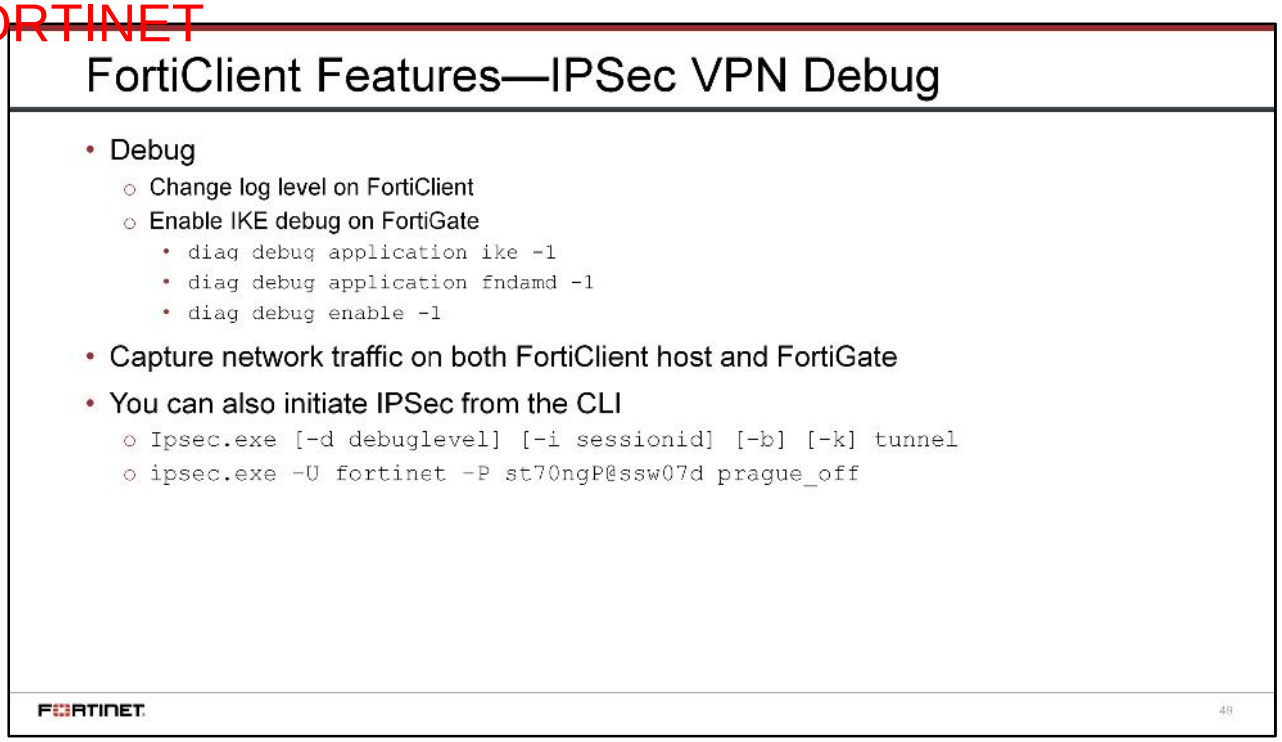
The `<ipsecvpn>` XML tag contains configurations specifically related to IPsec VPN.
IPsec VPN has two subsections:

- Options: Options related to the specific type of VPN.
- Connections: User defined connections.



VPN-related logs can be exported from **Settings** > **Logging** > **Export logs**. When troubleshooting VPN issues, as a best practice, change the log level to **Debug** and disable other types of logging to minimize the logs from other features.

The FortiClient-FortiGate dialup request is sent from FortiClient towards FortiGate. The FortiClient-FortiGate negotiates using aggressive mode. In aggressive mode, the IKE SA contains almost everything, such as the encryption type, length, hash type, and Diffie–Hellman (DH) group. It contains fewer exchanges and packets and is faster than main mode.

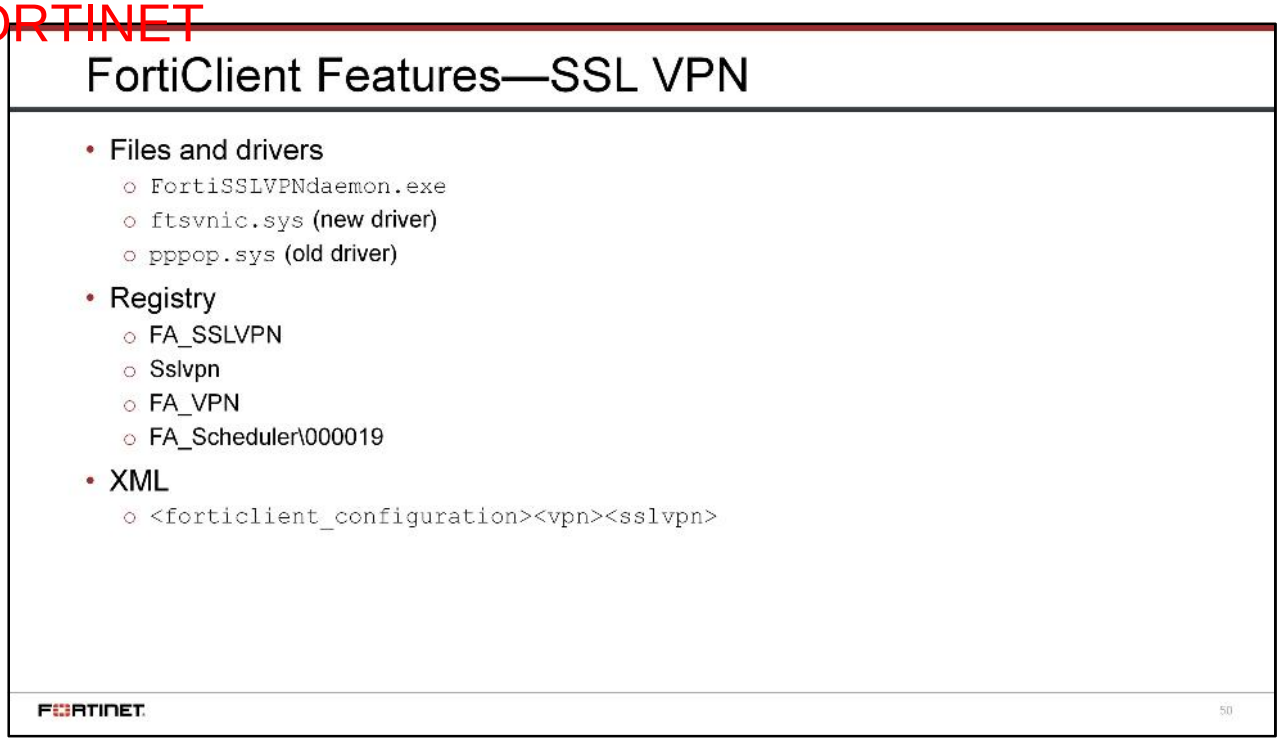


You can run the real-time debug commands on FortiGate, which will show you the similar information as on FortiClient.

As a best practice, run the debug commands on FortiGate to compare with the IPsec VPN logs on the FortiClient.

Apart from the real-time debug command shown on the slide, you can also run the following commands to troubleshoot IPsec VPN issues:

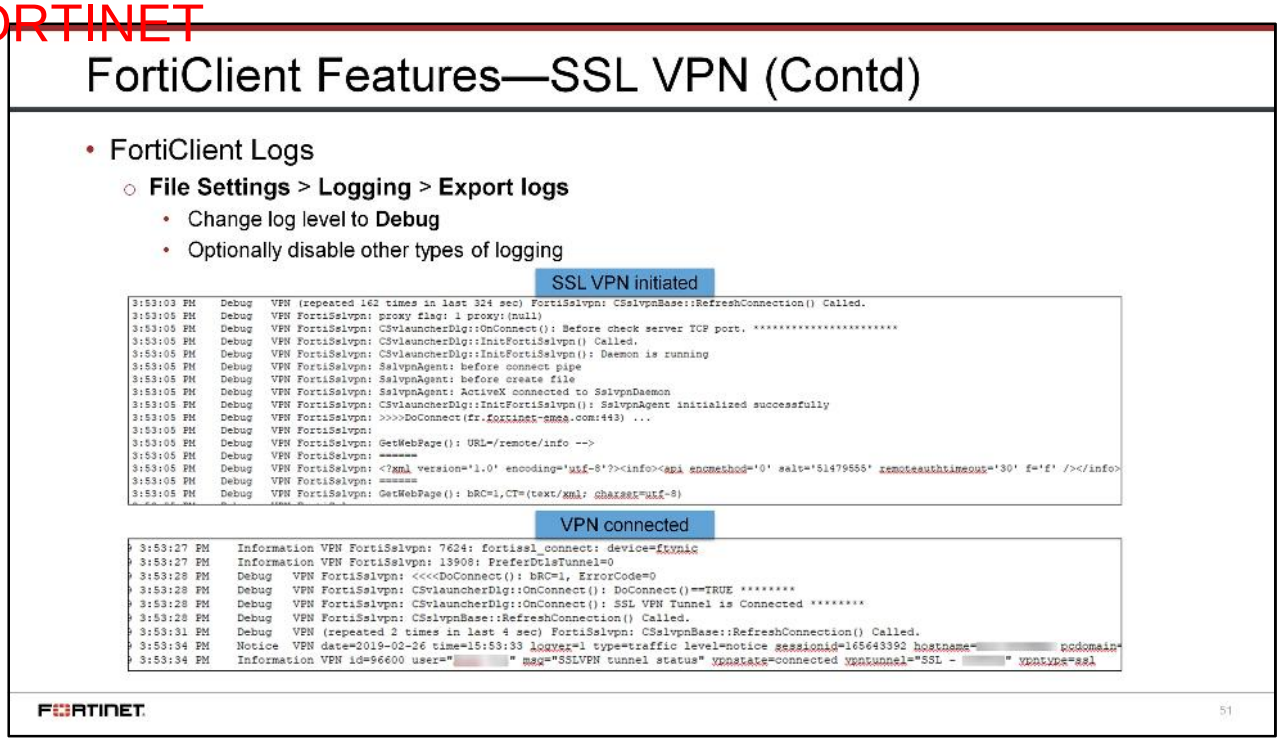
- Check the configuration as it is seen by IKE daemon: `diagnose vpn ike config list`
- List IKE SA : `diagnose vpn ike gateway list`
- List IPsec SA: `diagnose vpn tunnel list`
- Check status of all tunnels (equivalent to GUI VPN monitor): `get ipsec tunnel list`
- Check routes that were installed by the IKE daemon (applicable only for dialup IPsec VPN): `diagnose vpn ike routes list`



The FortiClient requires a number of files and drivers for SSL VPN.

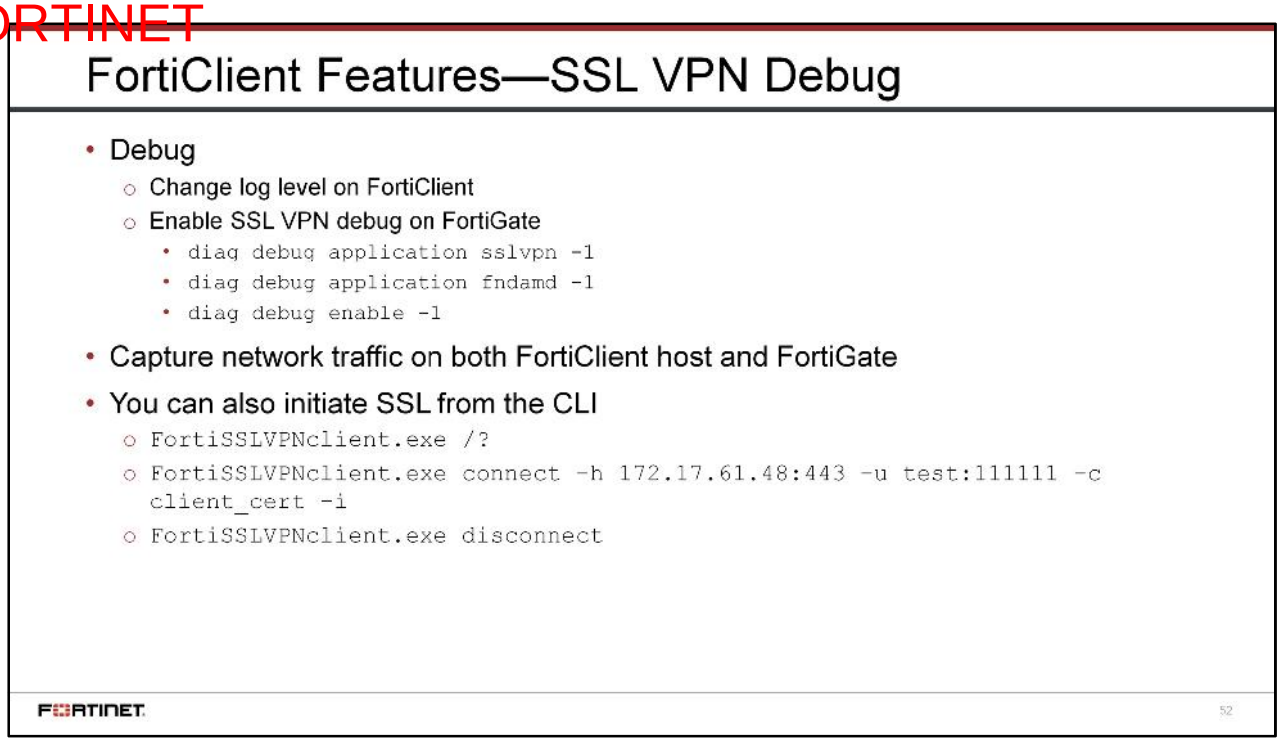
The `<sslvpn>` XML tag contains configurations specifically related to SSL VPN.
SSL VPN has two subsections:

- Options: Options related to the specific type of VPN.
- Connections: User defined connections.



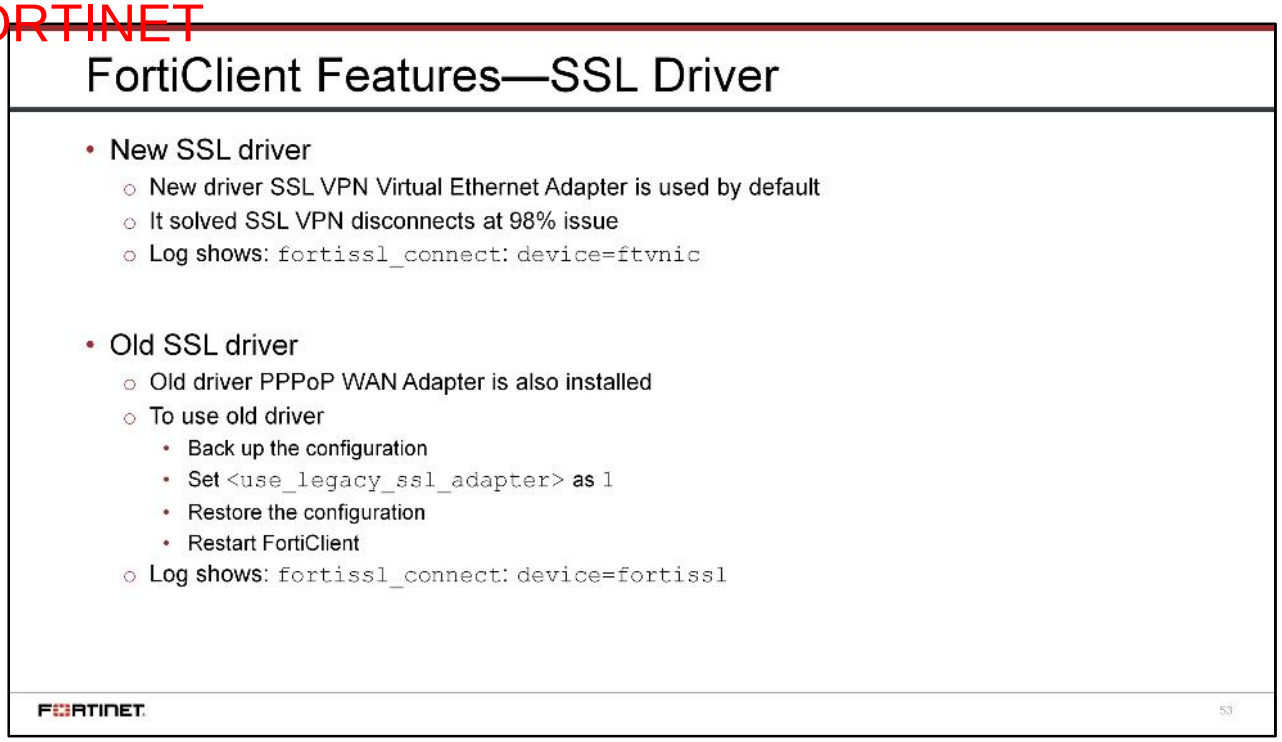
You can export VPN-related logs by clicking **Settings** > **Logging** > **Export logs**. When troubleshooting VPN issues, as a best practice change the log level to **Debug** and disable other types of logging to minimize the logs from other features.

The FortiClient-FortiGate SSLVPN request is sent from FortiClient towards FortiGate. The FortiClient-FortiGate checks the port number for the SSL VPN service and user credentials to allow access. The SSL debug logs show the initial connection requested made by FortiClient to FortiGate. Then the SSL certificate negotiation takes place between FortiClient and FortiGate. The FortiClient side certificate information is located in the `Installation directory\Fortinet\FortiClient` folder.



You can run the real-time debug commands on FortiGate, which will show you similar information as on the FortiClient.

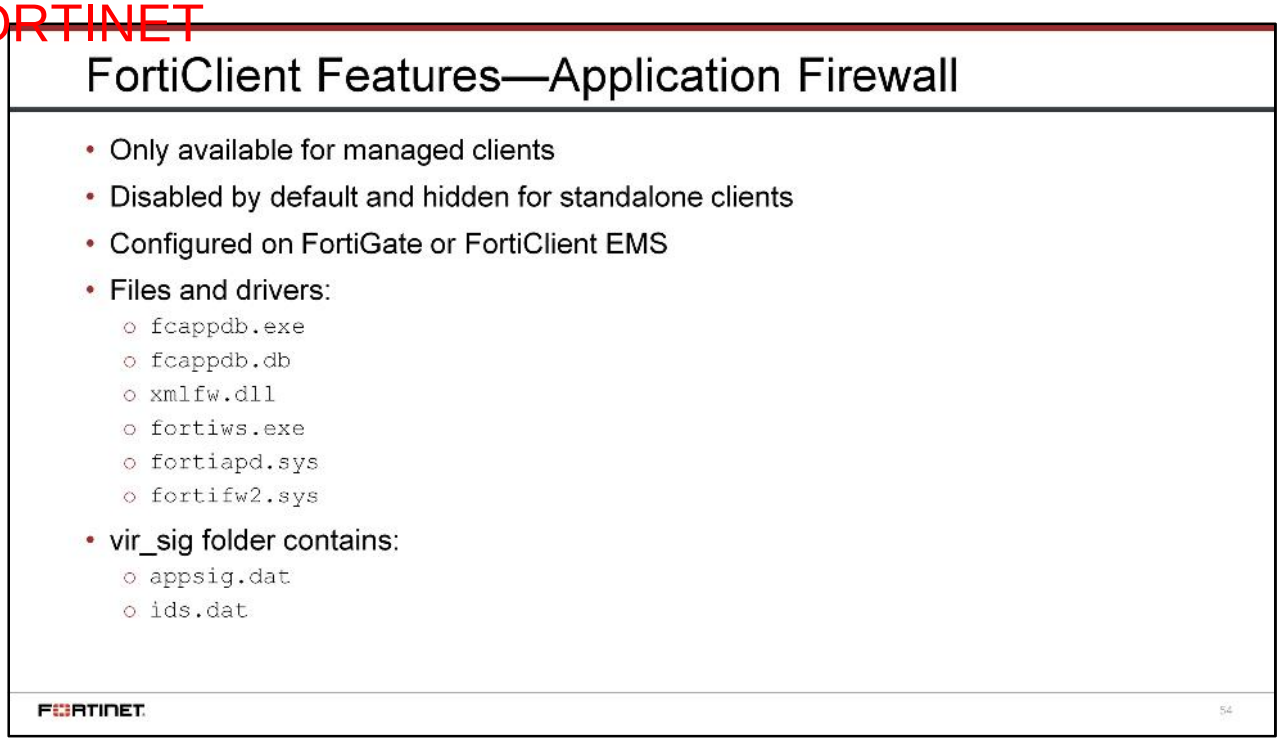
As a best practice, run the debug commands on FortiGate to compare them with the SSL VPN logs on FortiClient.



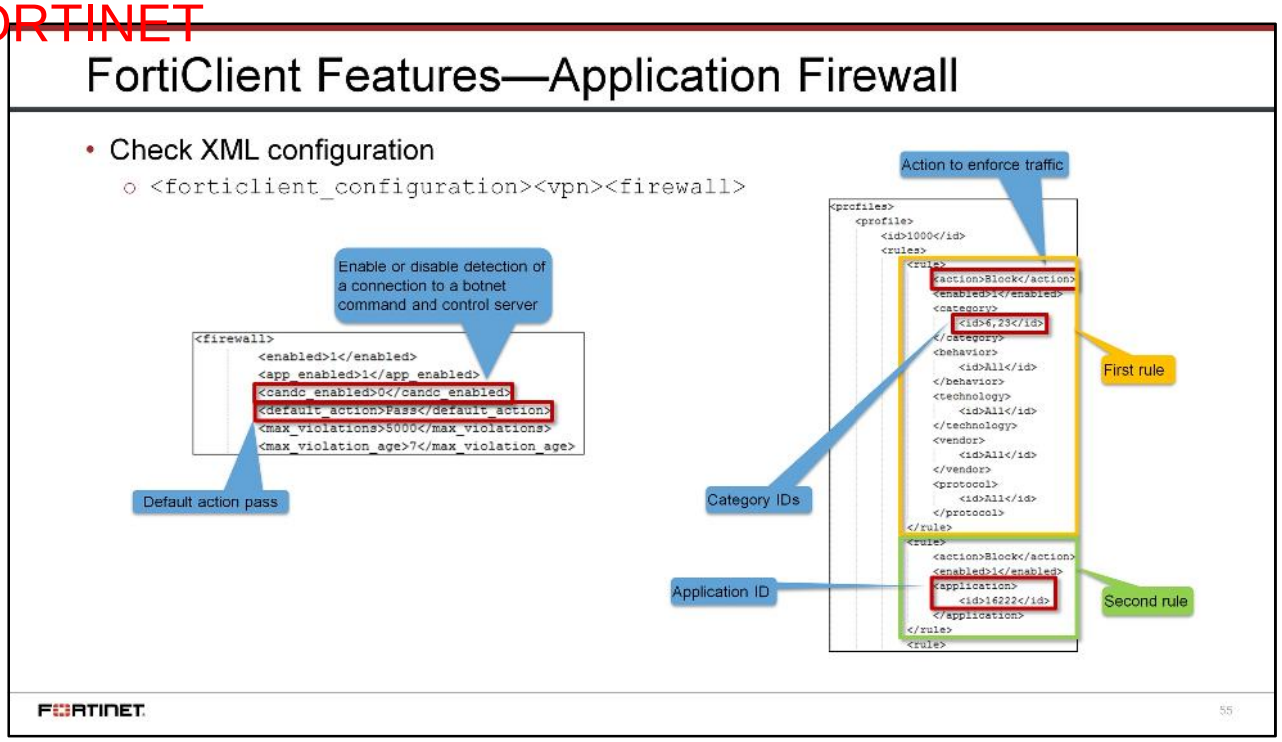
Fortinet added its own SSL driver, or virtual adapter, to resolve issues related to the Windows PPP Wan Miniport Adapter. By default, FortiClient uses a new SSL driver. In logs, it shows as `fortissl_connect: device=ftvnic`.

The old SSL driver is also installed and appears as `fortissl_connect: device=fortissl`. You can use the old driver by making the following changes to the XML file:

- Back up the configuration
- Set `<use_legacy_ssl_adapter>` as 1
- Restore configuration
- Restart FortiClient



By default, application firewall is disabled and hidden for standalone clients, but you can configure and deploy it from FortiGate or FortiClient EMS. Application firewall uses an IPS engine, so it matches the patterns in the entire byte stream of the packet and requires multiple files and drivers.



The application firewall XML configuration elements can be grouped into two parts:

- **General options**: Apply to all firewall activities.
- **Profiles**: Defines the applications and the actions that apply to the firewall activities.

You can enable the `<candc_enabled>` XML configuration element by setting the value equal to 1, to detect a connection to a botnet command and control server. The `<default_action>` XML configuration element value is set to `pass`, which enforces the action to pass on traffic that doesn't match any defined profiles. You can change the default action to `block`, `reset`, or `pass`.

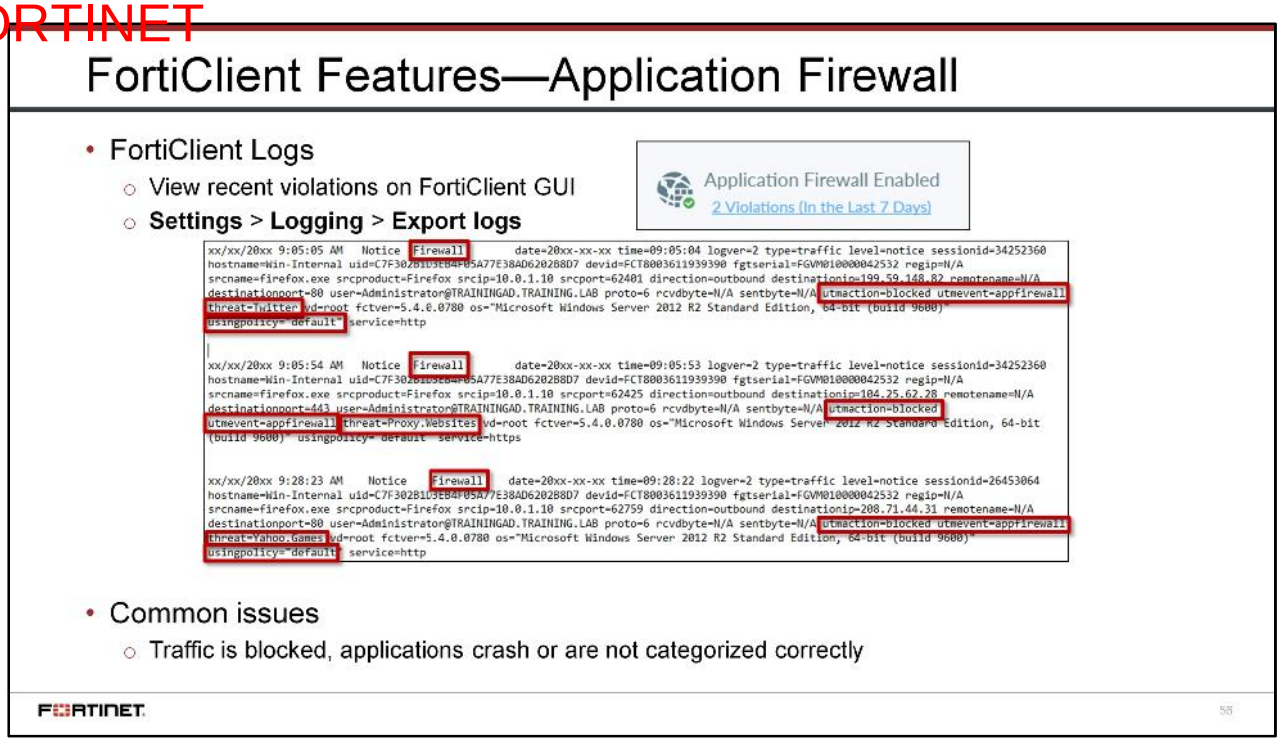
The `<profiles>` tag has a `<rules>` element. The `<rules>` element may, itself, have zero or more `<rule>` tags.

The following filter elements can be used to define applications in a `<rule>` tag:

```
<category>
<vendor>
<behavior>
<technology>
<protocol>
<application>
<popularity>
```

If the `<application>` element is present, all other sibling elements (listed above) will be ignored. If it is not present, a given application must match all of the provided filters to trigger the rule.

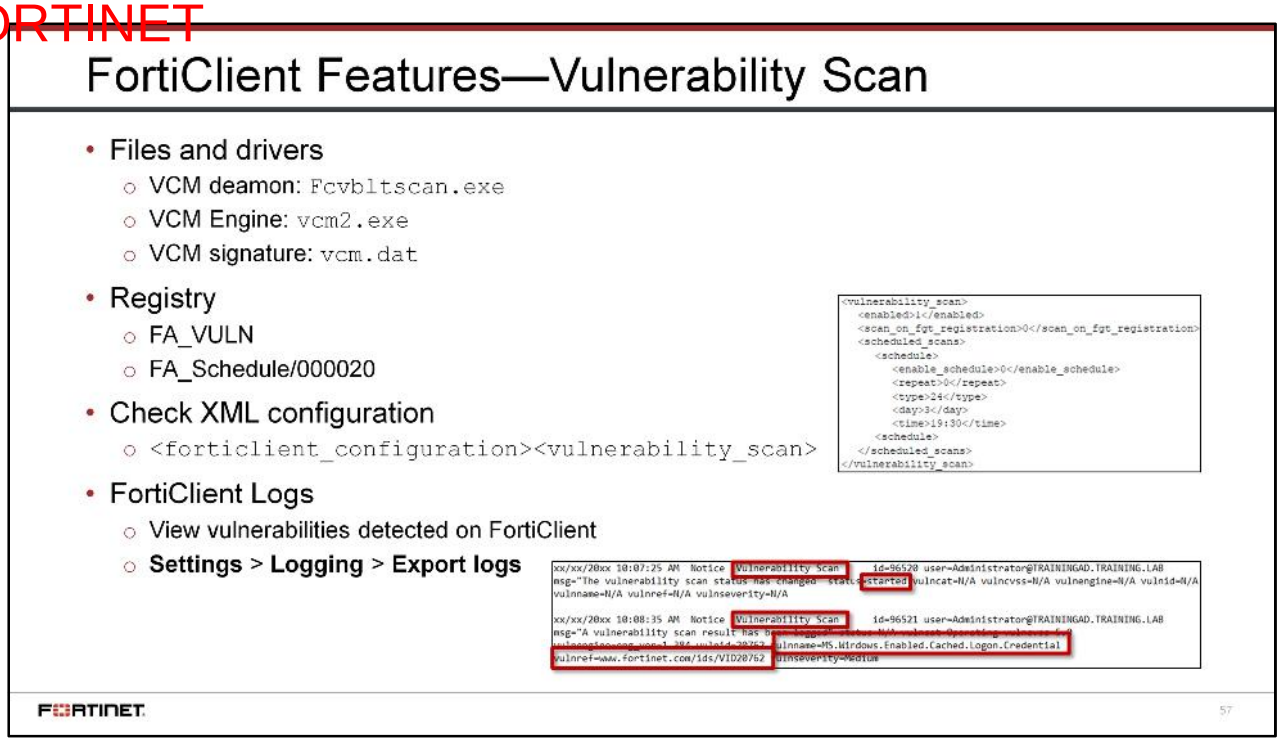
In the example shown on this slide, in the first rule, categories 6 and 23 are blocked, which corresponds to `Proxy` and `Social.Media` respectively. In the second rule, application 16779 is blocked which is `Yahoo.Games`. You can get the complete list of IDs corresponding to each category, behaviour, application from the FortiGate CLI.



You can view the application violation logs directly on the FortiClient GUI or export logs by clicking **Settings** > **Logging** > **Export logs**.

In the example shown on this slide, FortiClient blocks two categories (`proxy` and `Social.Media`) and the application Yahoo.Games, when FortiClient inspects the traffic passing through it and, based on the matching rule, takes action. In this example, FortiClient blocks Twitter, proxy websites, and `Yahoo.Games` based on the defined rule.

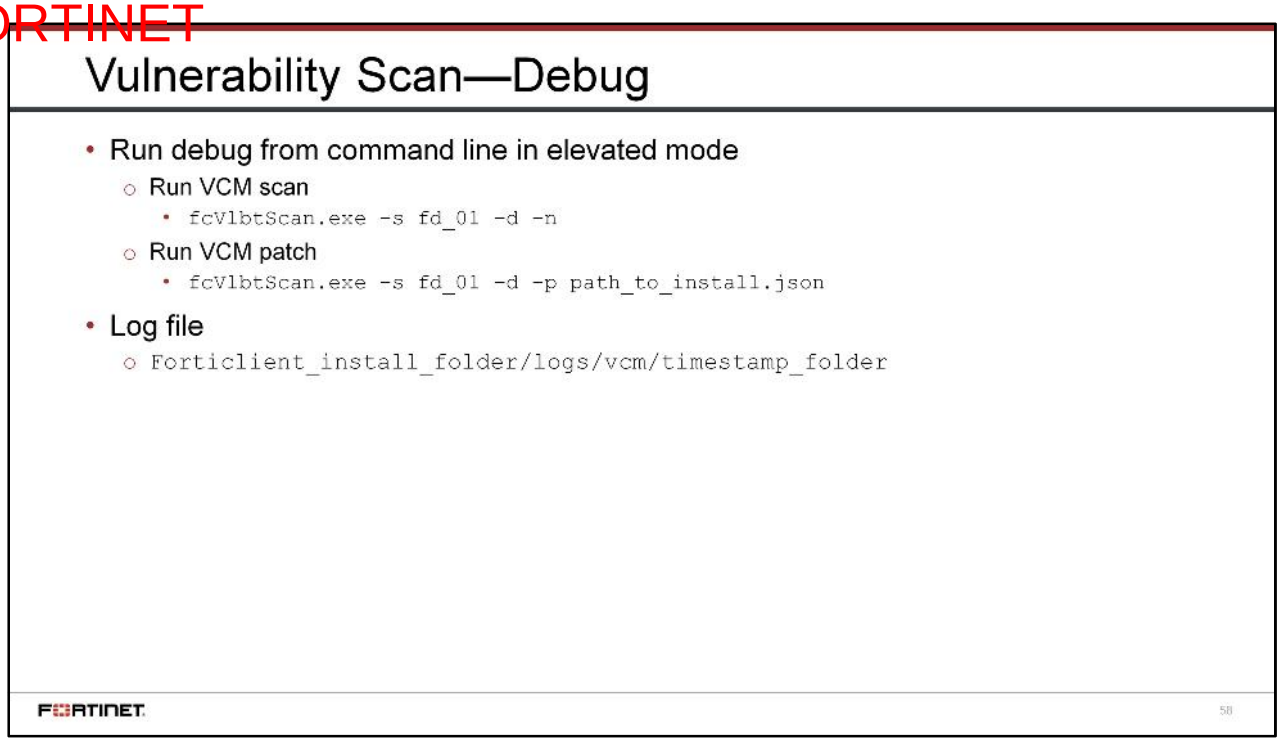
Some common issues are blocked traffic, and applications that crash, or are not categorized correctly.Try to disable FortiClient features one-by-one, to make sure the issue is caused by the application firewall.



The FortiClient vulnerability scan module can check your workstation for known system vulnerabilities. It uses various files and drivers to perform a vulnerability scan. You can scan your workstation when registering on FortiGate, or on a scheduled basis. Or you can run an on-demand scan directly from the FortiClient GUI and view the vulnerabilities found on the FortiClient console.

You can view the recent vulnerabilities detected directly on the FortiClient GUI, or you can export logs by clicking **Settings** > **Logging** > **Export logs**.

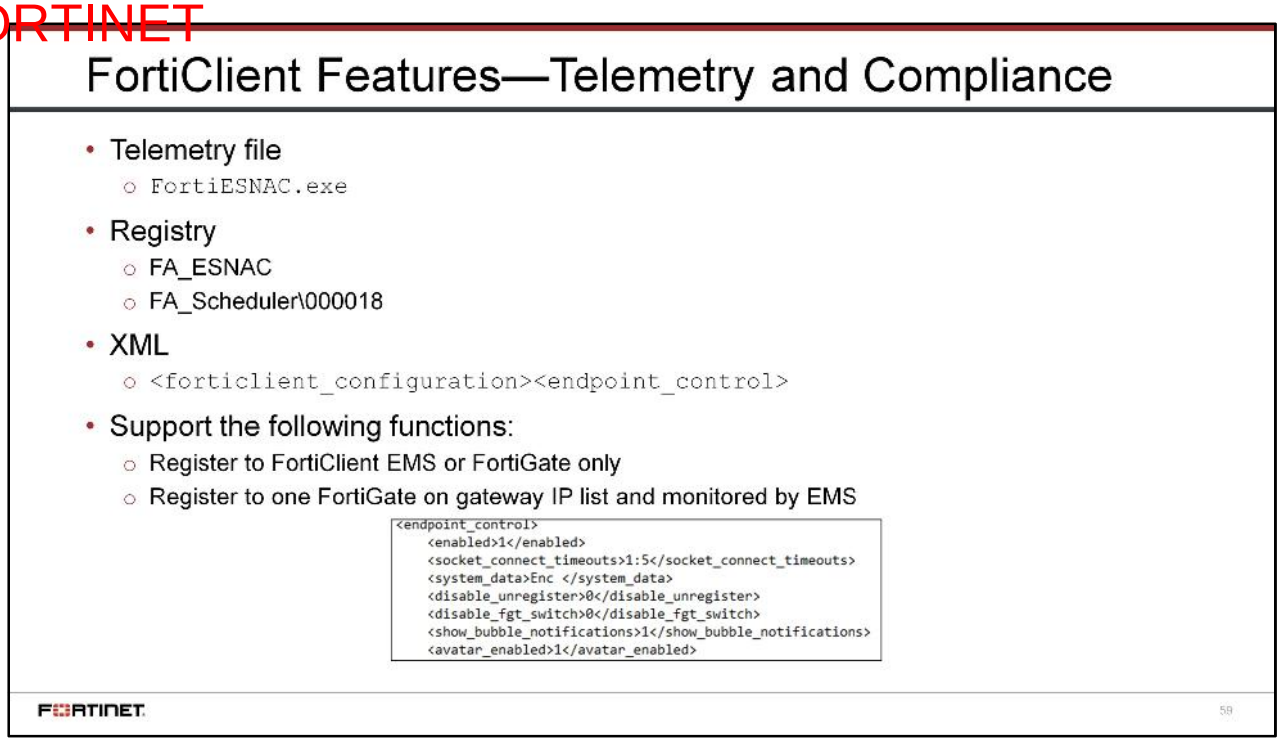
The vulnerabilities logs shows the status (`started`, `cancelled`) and also shows the name of the vulnerabilities detected, the severity, the vulnerabilities engine, and signatures used, and so on. It also provides a reference link, which provides the description, impact, and recommended actions for the vulnerability detected.



You can run a vulnerability scan in debug mode from the command line in elevated mode. After running the commands shown on the slide, the log file will available at the following location:
`Forticlient_install_folder/logs/vcm/timestamp_folder`

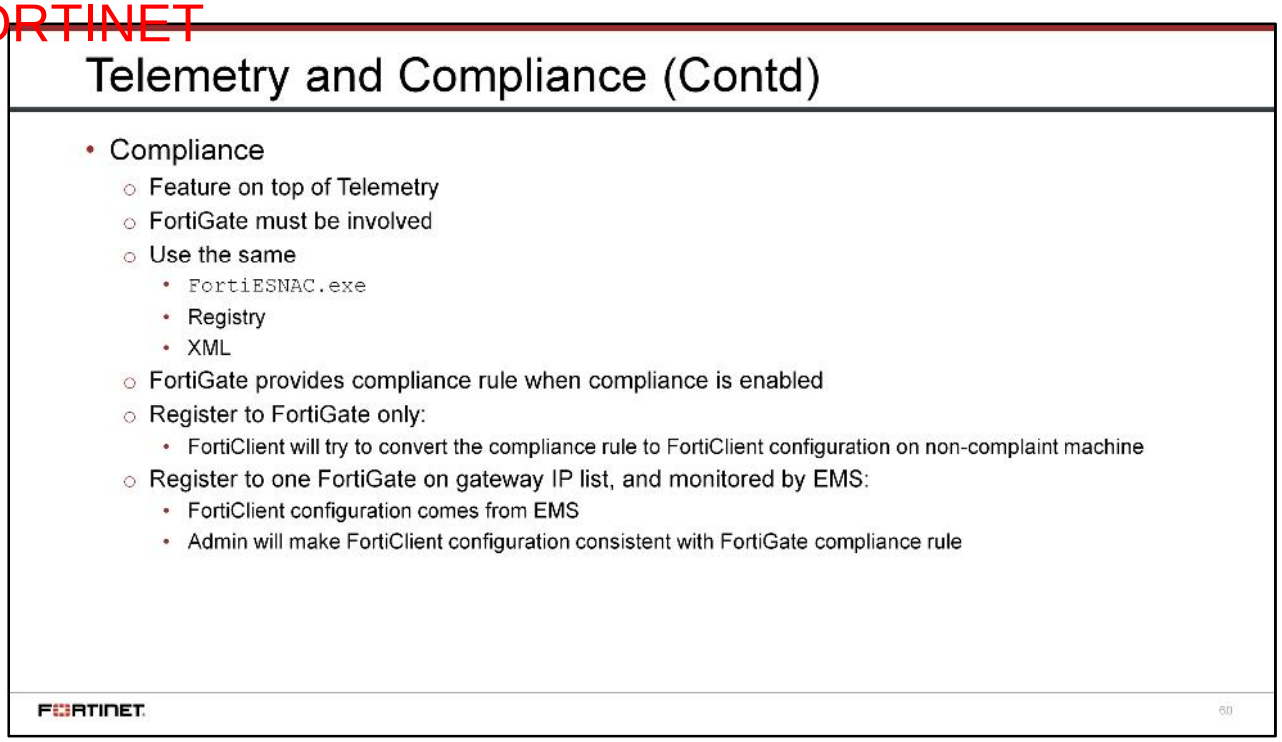
Example:
The following is a list of detected vulnerability JSON files, such as 36417.json, and so on:

- `Install.json:`
- `PatchedByProduct:.json`
- `Vcm scan and patch log: vcm_result.txt`



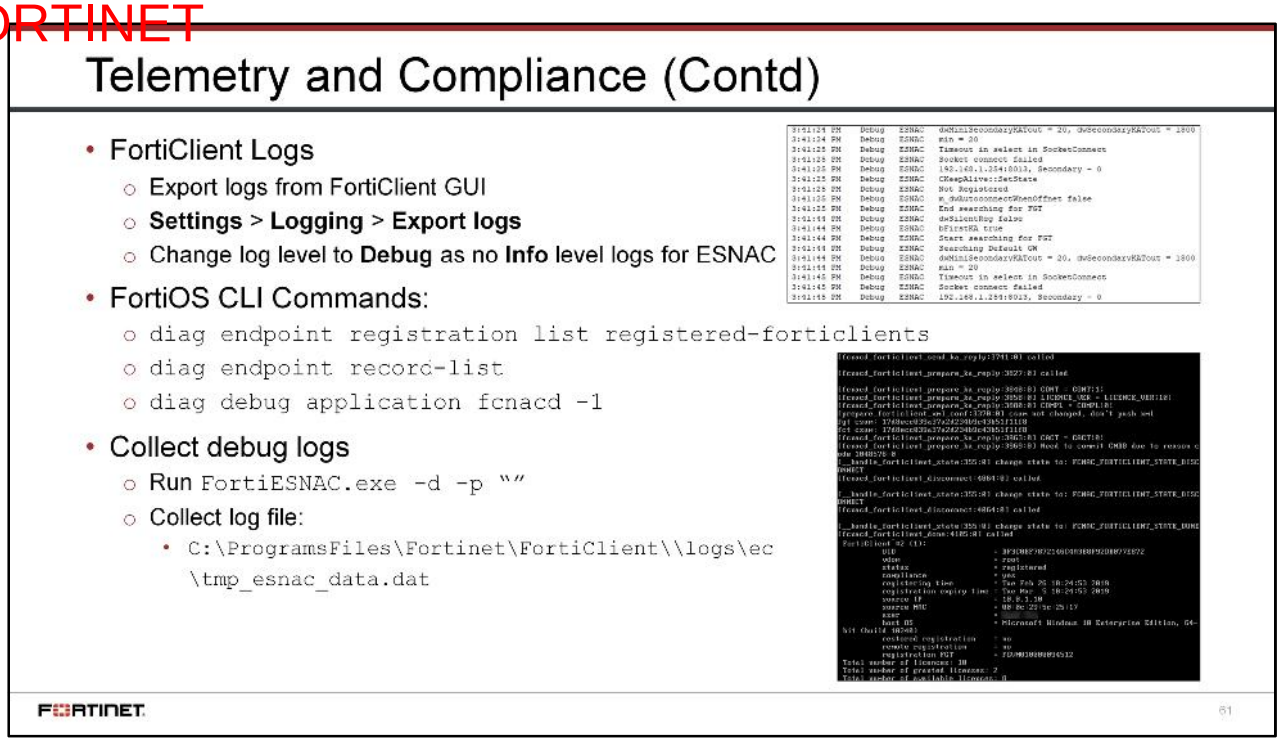
FortiClient requires one file, `FortiNAC.exe`, for Telemetry.
The endpoint-related information is contained inside the `<endpoint_control></endpoint_control>` XML tags.
The `<endpoint_control>` XML tag contains configurations specifically related to endpoint telemetry.
It contains:

- Endpoint UI settings
- On-net addresses
- FortiGate details to register
- NAC rules
- Connections: user defined connections



Compliance is the feature that runs on top of Telemetry. FortiGate must be involved. It uses the same `FortiESNAC.exe`, registry, and XML.
FortiGate provides the compliance rule when compliance enforcement is enabled

- Register to FortiGate only:
  - FortiClient will try to convert the compliance rule to the FortiClient configuration on a non-complaint endpoint
- Register to one FortiGate on gateway IP list, and monitored by EMS:
  - FortiClient configuration comes from EMS
  - Admin will make FortiClient configuration consistent with FortiGate compliance rule



You can export Telemetry and compliance-related logs by clicking **Settings** > **Logging** > **Export logs**. When troubleshooting these issues, as a best practice, change the log level to **Debug** because there is no **Info** level logs for ESNAC.

You can collect debug logs on an endpoint using the following steps:

1. Shut down FortiClient
2. On the administrator command line, run `sc stop fortishield`
3. Change registry (depends on 32-bit or 64-bit Windows)

   `HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\Fortinet\FortiClient\FA_Scheduler\00`

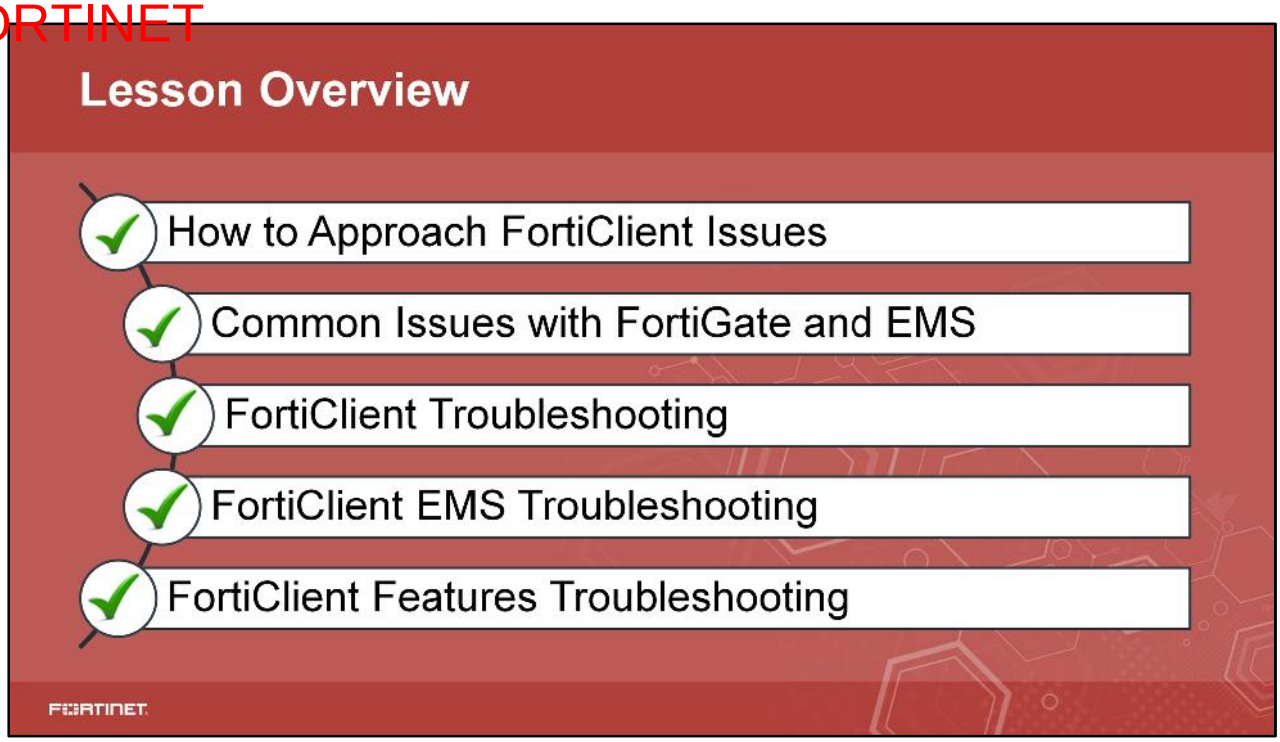
   `0018\cmd to FortiESNAC.exe -d` (-p <password > is optional).
4. Run FortiClient and register EMS as usual.
5. Collect log file from `C:\Program_Files\Fortinet\FortiClient\logs\ec`

For ESNAC, `tmp_esnac_data.dat`.

Knowledge Check

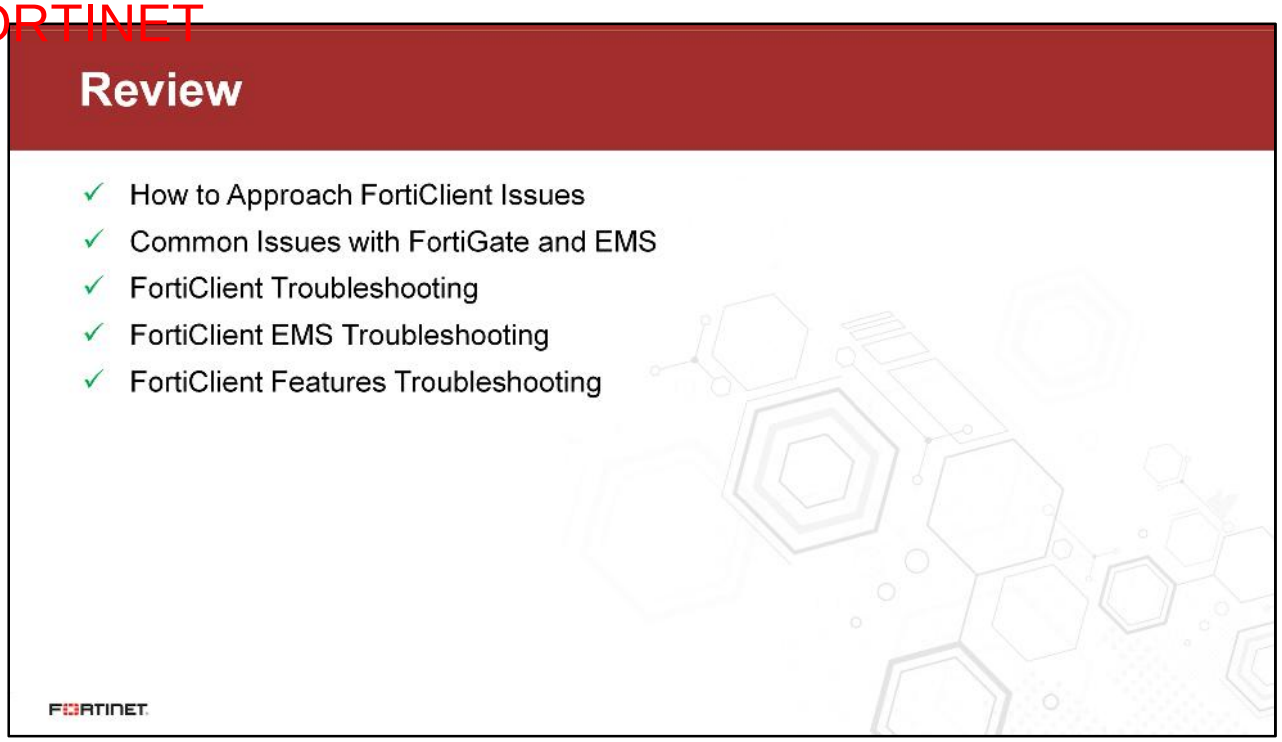
1. Which file is responsible for the FortiClient antivirus function?
   - ✓ A. `fmon.exe`
   - B. `fcappdb.exe`

2. Why do you need to change the `ESNAC.exe` (Telemetry) log level?
   - ✓ A. No information-level logs available
   - B. Limited details available



Congratulations! You have completed this lesson.

Now, you will review the objectives that you covered in this lesson.



This slide shows the objectives that you covered in this lesson.

By mastering the objectives covered in this lesson, you learned how to approach FortiClient issues and common issues of FortiClient with FortiGate and EMS and, how to diagnose and troubleshoot FortiClient features.